SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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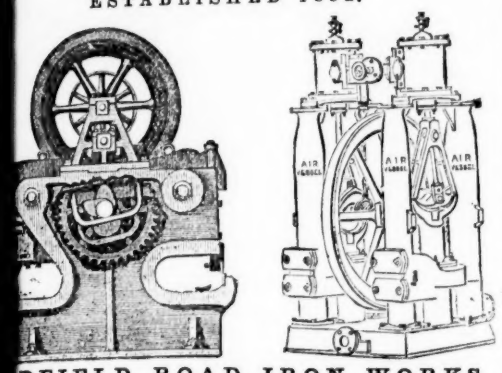

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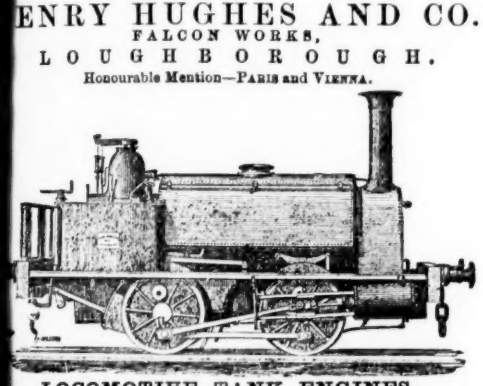

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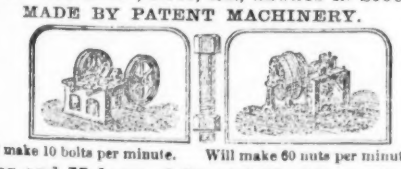

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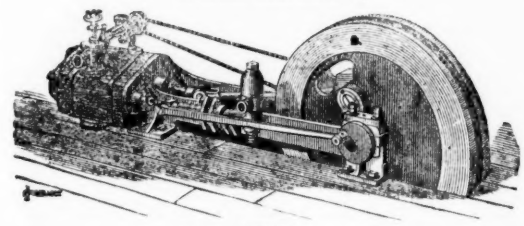

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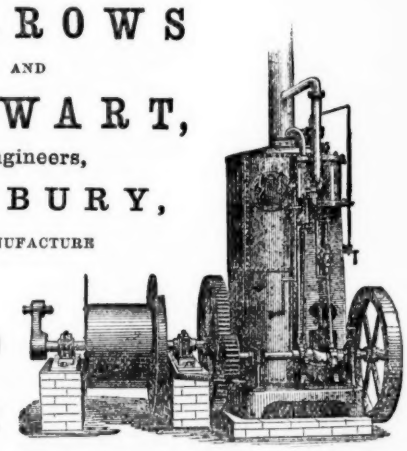

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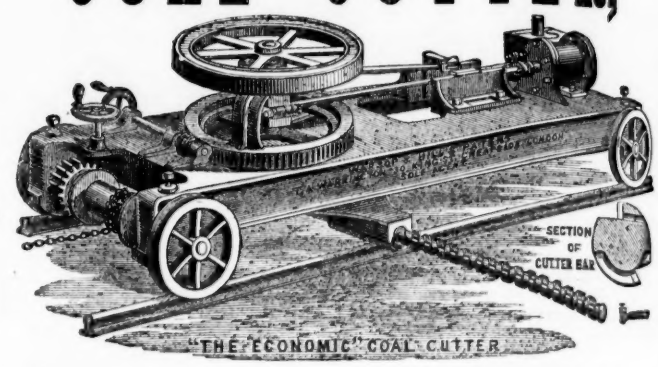

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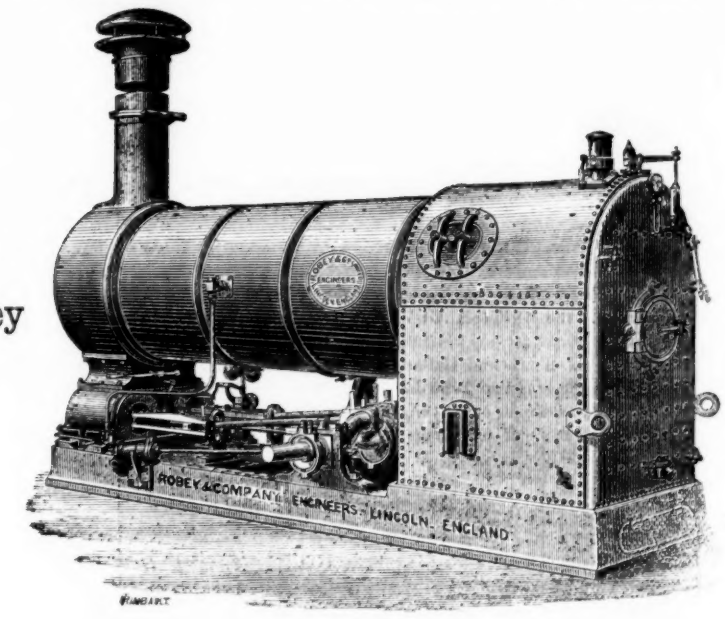

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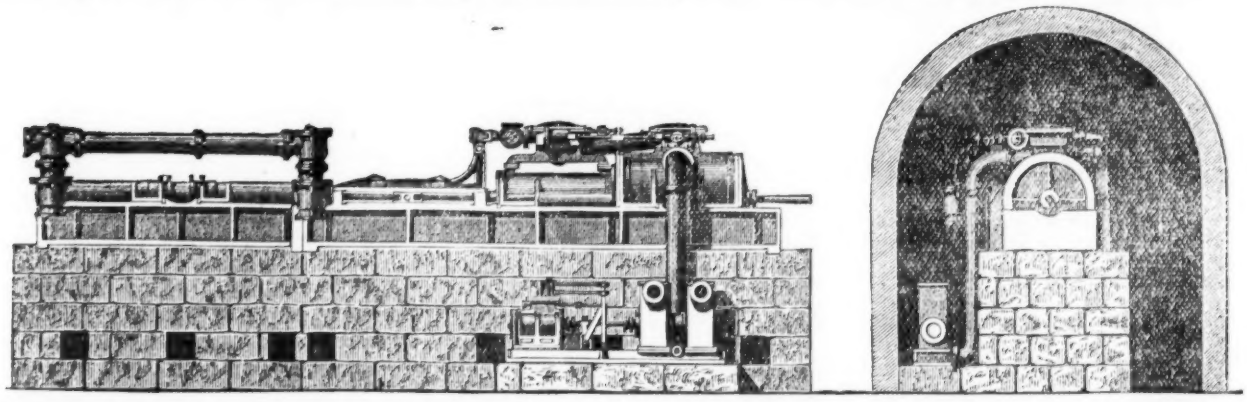

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A JAPANESE COAL MINE.

A few months after making his report on the Mines of Japan, to which we drew attention in last week's Journal, the Hon. F. R. Plunkett, of Her Majesty's Legation at Yedo, paid a visit to the coal mines in the neighbourhood of the town of Karatsu, and his observations thereon possess great interest, partly because they give an account of the working of coal mines in the purely native manner, and partly because they show—to quote the words of Sir Harry S. Parkes's covering despatch—how much more productive these mines might become if they were worked with the aid of foreign skill and capital.

The mines in question are situated in a valley which runs up at the back of the town, and the principal pits are about nine miles distant from it. The road to them, which, though extremely narrow and rough, is a good one, as roads go in Japan, passes up a valley of singular beauty and richness, from one to three miles wide, hemmed in by mountains, most of which are clothed with luxuriant forests to their very summits. The lowland is all well cultivated, and produces rice and cotton, while along the foot of the mountains wheat, millet, beans, and *kodrju* (the paper tree) grow in great quantities. The river which runs through this valley, nearly parallel to the road, is a regular mountain stream, with a broad bed and little depth of water, though apparently just sufficient to float the small boats which bring the coal down from the mines. The two districts near this river, from one of which the Japanese Admiralty draw their principal supplies of coal, contain a large number of different pits, each small in itself, but the aggregate of them producing a considerable amount of coal daily.

The pit visited by Mr. Plunkett, and which the Japanese consider a fair average specimen of the 40 other pits now at work in that part of the district, is about 2200 yards distant from the river, and is situated in a small lateral valley. It has but one entrance—an adit bored through the rock about 4 ft. wide and 3½ ft. high, carried down at an angle of 56° until it reaches the seam of coal about 100 yards from the entrance; thence it is carried on about 60 yards further, but at the bottom it becomes so small that it is only possible to advance by crawling on all fours. On either side of the main adit four side galleries have been opened, each from 10 to 12 yards in length, and not more than 3 ft. high; from these the coal is taken, the seam being apparently worked to a thickness of only about 20 in., and considerable quantities of coal are left along the sides and top. There are scarcely any wooden supports, and no precautions seem to be taken against landslips, except just at the entrance, where for a few yards some wooden shoring has been put up to support the roof. The miners work lying on their backs or sides, and never can stand up. The coal is removed by means of small picks and wedges, driven in with a hammer, and is placed on small oblong bamboo baskets, each holding about 130 lbs., provided with iron runners, which just fit the wooden sides of the ladder laid along the floor of the entrance adit; this forms a kind of rude tramway, along which the baskets are hauled up to the surface; they are drawn by boys apparently not more than 12 or 14 years old, who crawl on all fours, harnessed to the basket by a very short yoke, so short, indeed, that even when out of the mine, and working their loads across to the coal yard, they are still obliged to crouch in the same painful manner. They haul their loads up the incline, holding with their hands and feet to the ladder laid along the ground, and in the steeper portions of the adit an additional boy pushes from behind. The mine is lighted throughout with common open oil lamps, stuck here and there against the sides, and no care is taken to prevent accidents from fire-damp. Japanese miners say that no explosion has ever yet been heard of in any Japanese coal mine, and, therefore, they maintain that no precautions are required. This immunity that they boast of is, of course, due to their only working surface coal.

Mr. Plunkett's remarks on the ventilation of this pit prove clearly in what an elementary state mining is in those districts where foreign professional aid has not been availed of:—

As there is only one small adit to the pit, the ventilation below is atrocious. The only attempt made to improve it is that at the entrance of the adit, instead of leaving it wide open to the outer air, a small mud hovel, about 7 ft. square and 6 ft. high, has been built. There are no windows, but on one side is a small aperture about 2½ ft. high by 2 ft. wide, which serves as a door, and through which everybody must crawl to get in or out of the pit, for it is the only means of communicating with the workings. In the roof is an aperture of about 18 in. in diameter, on which a rude kind of chimney is made by seven *saké* (*i.e.*, wine or spirit) tubs, with their bottoms knocked out, piled one on the top of the other. A steady but slight draught of air is thus established between the small door and the chimney; it passes across the mouth of the adit, and no further attempt is made to improve the ventilation of the pit. We were assured that at all the other pits in the neighbourhood, although the adits in some cases run 400 yards into the hill side, the same rude contrivance is adopted.

Forty coolies are employed at this small pit, and they have six non-working days in the month; they work in pairs, and are paid principally by task work, earning from 10d. to 15d. a day each, according to their strength and industry. This pit, Mr. Plunkett says, is little troubled with water, but the means used for getting rid of it, which are much the same in nearly all parts of Japan, are of the most primitive and inadequate description. The working galleries being only about 70 ft. below the surface, a large square well is dug just above them to a depth of about 50 ft., and the water from below is pumped into it by small hand bamboo pumps, capable of lifting about as much as an ordinary garden syringe. On the surface, close to one side of the well, stands a high post, on which works a long walking beam, at one end of which, fastened to a thick bamboo, is a large tub; the bamboo is long enough to allow the tub to reach the bottom of the well, and at the other end of the walking beam four ropes are fastened. Inside the well, about 10 ft. down, is a small platform, on which a man stands to receive the tub as it comes up. When the tub is at the bottom of the well four men, holding the ropes mentioned above, run down the side of a small mound, thereby lifting the tub to the level of the platform, where the man, seizing it, turns the water over into a small channel made to carry it out into the valley, which is a few feet below, and where there is a small stream communicating with the river further down. The four men then walk up the hill again, thereby letting the tub fall to the bottom of the well to be re-filled, and so on till the water is reduced to the proper level. It is hardly possible that the tub can make more than 40 trips up and down in an hour, and as it contains only about 20 gallons, the total amount that could be lifted by this means would not exceed 19,200 gallons in the 24 hours.

The following is, in brief, the way in which the coal is transported from the pit's mouth to the port of Karatsu:—It is taken to the river side in small carts, holding from 2 to 3 cwts. each, and making eight or nine trips a day each way. The drawers (men and women) are paid by task work, earning on an average about 1s. a day, and to do this they must walk over 20 miles. From the mine to the river side boards are laid down, forming a very rough kind of tramway. There is a gentle incline down to the river, which is considerably in favour of the "surface carriers," as compared with the unfortunate boys *in* the mine. The carts used are of two kinds—one is a bamboo basket, placed on low wheels, and fitted at each end with semi-circular shafts, bending downwards, so that the hind shafts can easily be made to act as a drag; the other is a narrow wooden box, mounted on two high wheels, and fitted with a pair of shafts about 7 ft. long, joined together at the end. The whole system for carrying the coal, remarks Mr. Plunkett, is of the most rude and unsatisfactory description, and the amount of time and labour wasted therein greatly increases the cost for delivery on board ship at Karatsu. When first brought to the surface the coal is not emptied into the carts, but shot on to the ground, whence it has to be picked up by hand, and placed piece by piece in the carts. *Mutatis mutandis*, the same foolish waste of time and labour occurs at the river side. The valley is broad, with a steady and gradual fall towards the river, so that the remedy for this senseless state of things is most easy. The flat-bottomed boats in which the coal is carried down to Karatsu, where they deliver it alongside vessels, are long and narrow, and worked by one man only; they usually hold about 1¾ ton, but some of them carry 3 tons. The current in the river is so strong that they run down to the sea without difficulty, but owing to causes alluded to before, it takes on an average three days to get the coal from the pit's mouth to Karatsu.

The price of the coal at the pit's mouth is about 6s. 9d. per ton, and about 8s. 3½d. delivered at Karatsu. Mr. Plunkett was informed that these were the wholesale cost prices, but he says that 13s. per ton were paid for some delivered on board H.M.'s gunboat Frolic in which he paid his visit to Karatsu. It was not found to answer well, as it burned fast, formed much clinker, had an immense percentage of ash, and fouled the tubes very quickly. Japanese naval and mercantile steamers, however, burn it, and it appears that "where, from the shortness of the passage, the amount of coal to be carried is of little consequence, and when the furnaces are specially constructed to burn dirty coal, it can be used with advantage, as it is cheaper than Takashima, and, of course, far cheaper than any foreign coal."

The mines in the district of which we have been speaking have only been worked for about four years, and we must not forget that they have been worked in the purely native fashion described above, without any attempt having been made to develope them by the aid of European science. This being borne in mind, the following table, showing the total amount of coal sold at Karatsu in 1873, 1874, and part of 1875, possesses some features of interest. The share taken each year for the Japanese Navy is also shown in each case, besides being included in each total:—

Year.	Total sold.	Used by Navy.
January to December, 1873	Tons 47,143	Tons 8,451
January to December, 1874	54,878	14,360
January 1 to June 5, 1875	31,785	8,442

Reflecting upon the facts detailed in his report, and which he states from personal observation on the spot, Mr. Plunkett remarks in conclusion:—

When Europeans are allowed to take part in coal mining a better state of things can very easily be inaugurated; and the Japanese Government themselves would probably be the first to feel the advantages arising from the increased production and lower prices which will certainly be the result of invoking the aid of foreign enterprise and intelligence,

THE SAN JUAN COUNTRY—THE NEW SILVER LAND.

SIR,—In the south-western part of the territory of Colorado has been discovered, and, to some extent developed, a region that bids fair to surpass any other on the globe in the great number and enormous size of its silver-bearing veins. I forward a brief history of its discovery and development, as it will, doubtless, prove of interest to the readers of the *Mining Journal*.

During the "Pike's Peak" excitement, in 1859-60, this region was visited by a party—several parties, in fact—of gold hunters, searchers for placer mines. No placers were found; but it was noticed that the mountains everywhere were streaked and severed by great veins of quartz. At that time quartz veins carrying either silver or gold were not known in Colorado to any extent, and could not be made of any use. Then two or three years afterwards—in 1863—the whole south-western portion of Colorado was made an Indian reservation, which effectually put a stop to prospecting, since the treaty expressly stipulated that no white man should be allowed to pass over or enter upon the Indian grounds.

Thus it was this region remained a real *terra incognita* through all the years they were discovering and developing other parts of the territory. True, an occasional wanderer, seeking gold or avoiding justice, found his way over the ranges and valleys that are now the San Juan country; but his story only added to the interest and confirmed the marvellous tales of the men of 1860.

The Indians were watchful and jealous. They had learned that but a foot-hold for the pale-face in the beginning was expulsion for them; and so, sometimes good naturedly, at other times savagely, but always effectually, the intruder caught upon the hunting grounds was turned back, and warned to come no more.

This was the situation up to 1869, when one of the men who had seen the great veins in 1860 determined to have samples of rock from some of them, and test their richness. With a single companion, this man, named Adnah French by name, passed up the Rio Grande to its head, into and down Cunningham Gulch, to its confluence with the River Animas, where now is located the mining town of Howardsville. This is near the centre of the mining region. They took samples from many of the veins, returned, had them assayed, found them to be rich silver ores, and the San Juan Country was discovered. The news spread. Miners and prospectors were wild; but capital, more cautious, hesitated. An Indian reservation is not a safe place to which to invest, said moneyed men.

The Indians growled and threatened, even turned back and abused, some prospectors who encroached too far the following year—so that during the year 1871 not more than about a dozen men braved the danger; and nothing was done, except to locate a few claims, and take a few samples. The following year (1872) probably 75 or 100 miners went in, and a mill with which to work the gold mine, the first discovery made, was taken over the range. An attempt to treat with the Indians for the part of their reservation, which included the mineral deposits, failed through petty political jealousies. Still the steadily-increasing interest, caused by better and more specimens of ore, caused Government to make a second attempt to treat, in 1873, which was successful, though the treaty was not ratified till March, 1874. This year (1873) the mill taken in the previous year was put up, and run with good success. Some 200 or 300 miners were in the valleys and on the mountains. Some work was done to test the value of the veins, and, for the first time, the country began to assume the appearance of a lively mining camp.

During the year 1874 titles could be acquired, and the work necessary by law to obtain them was vigorously pushed, according to the means of the claimants. A blast furnace for custom work was taken in, and was fairly successful, in spite of the grossest ignorance and mismanagement. A few ores were shipped, enough to prove their almost universal and remarkably even value.

The past year has been a lively one. Four furnaces have been erected (three new ones, and the one of last year re-built), and more or less successfully run—the success in all cases being in proportion to the honesty, knowledge, or means of the proprietors.

GEOGRAPHICAL POSITION.—By an examination of any late map of Colorado it will be seen that these mines are located upon the Pacific Slope, being almost upon the summit of the range that divides the waters of the Atlantic and the Pacific, and upon the very head waters of the Animas river—the Uncompagne river and the Lake fork of the Gunnison. All of these streams find their way by different routes into the Colorado of the West.

WOOD AND WATER are more plentiful than in any mining camp in the whole West.

HOW TO GET THERE.—From Denver, Colorado, the distance is about 320 miles; south by rail, about 160 miles to Cachares: thence by stage to Antelope Park, a distance of 140 miles, the last 20 miles being performed on horseback or by private conveyance over a pretty rough road. Except the last 20 or 25 miles the road for the whole distance is as good as need be.

FREIGHT.—It costs about $90 to bring a ton of the ore from the mines to New York.

LABOUR.—There is no lack of labour, miners getting from $2 to $3·50 c. per diem; and common labour, $30 to $40 per month.

GENERAL CHARACTERISTICS.—I will not attempt to go into any scientific reason why this promises so much as a mineral region. The few men of science who have visited us are ready with geological and mineralogical data to prove that the precious metals will be found here in quantities heretofore almost unknown. The veins are enormous in size, often from 10 to 40 ft. wide, and possess all the characteristics of true fissure veins, such as good and well-defined wall-rocks—a positive "gouge" or separation—and carry, besides the mineral, spars and decomposed quartz. They outcrop for miles in length, and, in many instances, show in almost an unbroken streak from range to range and valley to valley, visible for their whole length, except where here and there covered by rock-slides or the debris of decayed forests. Of their depth there can be no doubt, since these huge veins can be seen, often running like a wall from the foot to the summit of a mountain from 4000 to 5000 ft. high, and then down to the same level on the opposite side. They are mostly quite perpendicular, and have, as a general rule, a northerly and southerly course.

CHARACTER OF ORES.—Nearly all the varieties of silver ores that occur in the Territories are found here. Native silver, in crystalline and amorphous masses, and as wire silver. Silver-glance, but only in disintegrated particles. Brittle silver often occurs. Ruby silver, both antimonial and arsenical. The ores that have thus far produced most of the bullion, and from which the early products will, no doubt, come, is what the miners call grey copper ore, a sulphide carrying from $100 to $500 in silver, sometimes as much as $5000, and argentiferous galena. In the latter ore it seems to be the same massed grey copper, intermingled with the galena crystals in eyes or streaks, that produces the silver.

These are a few of the facts that four years and more of careful personal observation has enabled me to collect; of course, thousands of dollars will be expended there. I certainly know of no mining district in all North America (and I am more or less familiar with most of them) that promises as prompt and great returns as this.

New Jersey, March 7. ——— MINER.

THE MONSTER CROWN POINT AND BELCHER PUMPING-ENGINE.

SIR,—In the notice of the above engine in last week's Journal—extracted from the *Territorial Enterprise*—it is stated, that "the valve motion is to be controlled by Patton's improvement to Davey's differential gear." The truth is, the engine is to be worked by means of Davey's differential gear, for which a license is granted to the makers. Probably Mr. Patton has arranged the details of the engine, but the facts should be correctly stated. HENRY DAVEY.

Sun Foundry, Leeds, March 18.

THE RICHMOND CONSOLIDATED—PROF. PRICE'S REPORT.

SIR,—A good deal has been said about Prof. Price's report in reference to the value and extent of the reserves. Different opinions, I am aware, have been expressed, and are now entertained, but I contend that the second report, so far from proving the incorrectness of the estimate in the first, sufficiently and conclusively confirms it. Clearly the intrusion of limestone and unproductive matter where ore had been reckoned upon—a result which no expert could have anticipated—is more than made up by discoveries of rich ore where there was supposed to be limestone. Prof. Price cannot be held answerable or responsible for the former, nor does he seem to take credit for the latter.

Unjust to Prof. Price is the statement that because limestone has been found instead of ore his opinion is untrustworthy. All know full well, without Prof. Silliman's views upon the subject, the task is always thankless and unsatisfactory to estimate ore reserves. The difficulty is made apparent enough by Prof. Price's own explicit statement, that "in none of the openings at the time of my examination in May (1875) was there any indication whatever that the vein was not homogeneous throughout." On the other hand, the professor says "it would seem as if the intrusion of the country rock into the vein forced the ore towards the north-west—what appears as two distinct ore bodies is in reality only one; the ore in both is rapidly approaching each other, being only some 50 ft. apart at the present time. The ore body is extending also towards the south-east, and is at a point 20 ft. above the 600 ft. level, fully 35 ft. further south-east than in the stopes above, appearing as if the ore is still extending to the south-east of the barren material. The north-western stope is entending north-westerly as well as south-easterly, and is making strongly upwards towards the 500 ft. level. There is every appearance at the present time that my estimates between the 500 and 600 ft. levels will be more than realised."

Forgotten, or more probably unknown, to adverse critics is the important fact that these changes have taken place throughout the entire development of the mine; a striking instance is the Flat Chamber in the 200 ft. level. Mr. Clarence King and Prof. Price first gave a large estimate, and then a very small one by Mr. M'Gee, the then manager. Nevertheless, the Flat Chamber is yet producing ore, and surely Prof. Price has reason on his side when he contends there is a fair chance that such will prove to be the case in the lower workings.

Nothing has yet occurred to disprove Prof. Price's estimates, as subsequent uncomputed discoveries leave a large credit margin for the intrusion elsewhere of barren matter. If shareholders are called upon by a "Member" of the Stock Exchange to unfavourably view their mine, I, as one of them, call upon my fellow-proprietors to remember the words of Prof. Price, "that the mine may appear one day as suddenly coming to an end, while on the next a large chamber of ore may be developed. . . . . After a careful examination of the Richmond Mine I have no hesitation in stating that the mine never looked better, as a whole, than at present."

March 22. ——— SHAREHOLDER.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—Last summer it suited a clique on the Stock Exchange to knock up the Richmond to 16*l.*; now it suits them to knock them down to 6*l.* by letters and circulars frightening the shareholders out of their shares, the object being to get in at a low price to knock them up again. Let us value the shares of this company by facts, not assumptions. The first year's returns from the mine were $885,000; the profits, including dividends and amounts written off, were in round numbers 62,000*l.* The second year's returns were $1,765,000; the profits 86,000*l.* Then the company rendered half-yearly accounts. The returns for the following half-year were $1,121,000; the profits 80,000*l.* The next half-year the returns were $986,000, the furnaces being shut down for a month; the profits 34,000*l.* The returns for the half-year just ended in February (as returned from the office) are $1,005,000, being only $116,000 less than the corresponding half-year in the previous season, during which the company made a profit of 80,000*l.* Hence, taking the whole of the difference of $115,000 in the returns as being actual loss, the late half-year ought to realise, in comparison with the previous half-year, a profit of 55,000*l.* In all mines the returns must more or less vary, and I fail to see why a reduction of only 10 per cent. on the best half-year's returns the company ever had should warrant the shares being knocked down from 16*l.* to 6*l.* It is said dividends are not being declared. True, the directors instead of dividing these profits have, with the concurrence of the shareholders, been utilising them as working capital for the benefit of the mine. It must be recollected that the mines acquired by the company have cost more than the whole of its nominal capital, and that in three years it has not only paid one-half its capital back in dividends to the shareholders, but has expended out of profits in buildings, stores, &c., an amount equal to about another half. A mine whose returns average about 8000*l.* per week, and whose produce necessarily cannot be turned into cash under four or five months, requires a large capital for turnover, and the experience of the late panic in California led the directors to wisely abstain from paying further dividends until they have made themselves secure against another such contingency. I blame them for not having adopted this step a long time since.

As it takes from four to five months from the moment the miner's pick stopes the ore away in the mine till its actual sale for cash, the turnover capital in the concern represented by the mine's expenditure during that period would always require to amount to from 100,000*l.* to 120,000*l.* Hitherto the company has drawn on a Californian banker to raise this amount, and this has been magnified into a large debt being due by the company, whereas it is nothing more than the ordinary practice in trading of drawing bills as against goods, the banker being secured by ore and bullion. I am told by adopting this plan of not distributing the profits the company has already reduced the banker's debt of 127,627*l.* to 65,000*l.*, and as there is already 39,000*l.* of debenture capital issued, the payment of this amount will reduce it to 26,000*l.*, whilst the amount of ore and bullion held against the debt was 108,378*l.*, hence the company, if not already, will very shortly be in a position to be able to pay cash for everything. As the profits are fructifying for the benefit of the concern, it stands to reason it must daily stand on a firmer basis. Directly this is accomplished shareholders will bear in mind that their whole capital will then be represented by actual money laid out on the mine, and the working capital sunk in the concern without anything being added for the value of the mine. Moreover, the directors, instead of diminishing the dividends to write off

charges on capital account out of revenue, will be able to divide the whole of their profits from time to time amongst the shareholders. So much for the financial position of the company.

Now for the position of the mine itself. The original fall in the shares took place in consequence of the intrusion of a horse of limestone into the lode, and so apparently diminishing the reserves. It has now been demonstrated that it only forced its way in between two bodies of ore, and another body of ore has been discovered standing on the other side of the horse. It is a question whether this other portion of the ore does not extend upwards far beyond the upper level. Of course, this can only be surmise, but if found to be correct the value of the reserves must be considerably enhanced. Again, the bottom of the mine is in the richest ore it has ever produced. The average hitherto has been about $60 ore. The average of this new discovery at the bottom is upwards of $100, and, above all, it is very rich in lead, the importance of which any smelter will acknowledge. It is said, why does not this new discovery make the returns better? Miners would answer, until they connect the level with the winze to get under the ore they cannot stope it away. By the last report they had 65 ft. to drive to accomplish this; and, as they could get at it at both ends, they ought to have accomplished it by this time. When this ore passes through the furnaces the returns will jump up to $60,000, and then let the "bears" look out. The latest reports show that, instead of working the ore at one point only, they are now finding it at several points. All this, to a miner, proves the stability of the mine, whatever those interested in knocking the shares about may say. My advice to those shareholders who were let in at the highest prices is try now to average your price, and you will have good value received for your money.

A SHAREHOLDER FOR UPWARDS OF THREE YEARS.

AIR-COMPRESSING MACHINERY.

SIR,—I am not concerned to defend my character as gentleman, Christian, or practical man, and earnestly deprecate the importation of such perfectly irrelevant matters into your columns. If I have been guilty of ungentlemanly or unchristian conduct I unhesitatingly apologise to yourself, your readers, and Mr. Hurd; but, as the giving of my name will not remove the only obstacle, by making me a whit more practical, I hope he will excuse my doing so, and give the particulars asked for. I do not think the questions are unreasonable, and I know they arise from a desire to arrive at truth, which I believe Mr. Hurd, in common with thousands of other practical men before him, has unwittingly missed; and it is to be hoped your readers will not be compelled, by the withholding of the figures, to come to a less flattering conclusion.

TYRO.

Widnes, March 20.

COAL-CUTTING MACHINERY IN ENGLAND AND AMERICA—THE "MONITOR" AND THE "PICK."

SIR,—I fully hoped that my letter in the Journal of Sept. 4 would be my last contribution to this long discussion, but after reading Mr. Firth's letter of Sept. 14, I feel called upon to correct some erroneous impressions he may have left upon your readers. I should here remark that absence from home and almost continuance journeying have prevented an earlier reply.

Referring in the first place to the size of the air-conveying pipe used in the Garth Colliery, in Monmouthshire, I would say that I accept without question the correction of the proprietors. I certainly had the impression that a 6-in. pipe was used, but, no doubt, I have confounded with this some other compressed-air operations. Whenever Mr. Firth can bring such conclusive proof of error in my statements I shall be very glad to make the proper acknowledgments. The rich vein which Mr. Firth imagines he has discovered in what he denominates "some of the American newspapers," and from which he quotes so freely in his last, I presume can be traced to an editorial which appeared in the Coal Trade Journal (New York). This editorial was evidently written since the commencement of this discussion, and the points referred to by Mr. Firth were, no doubt, gleaned from communications which have appeared in the *Mining Journal*. Therefore, without further remark, I pass over all his comments upon points derived from this source, and proceed to his reply to my last communication. I would add, however, lest Mr. Firth might again fall into an error of this kind, that I have published nothing upon the subject of coal-cutting machinery which has not appeared in the *Mining Journal*.

After Mr. Firth's long and persistent attack upon the comparatively large cylinders of the Monitor, I am very much surprised that he should now declare himself as follows: "It is yet an unsettled point whether or not it is commercially economical to employ large and heavy plant with lower pressure, or light and cheaper first cost with higher pressure. At collieries there is generally much inferior fuel, hardly worth the cost of transportation, but capable of giving steam for compression, and I incline towards the latter plan, although I have no bias one way or other." It is very difficult to understand the exact position of so vacillating a person. He set out upholding the Pick—with its 3½-in. kerf and high pressure—as the best type of a coal cutter; but from the above quotation it will be seen that after all he merely *inclines* towards high-pressure plant. However startling this admission may seem, it is even more astonishing to learn from his pen that a "reformed Pick" is a possible thing, and that he has already taken steps "to reduce the groove to one-half its present self." Why he should venture the opinion that I will not be pleased to know this I cannot understand; it is certainly an acknowledgment on his part that in one respect, at least, the Monitor occupies an advanced position, having solved a very important problem upon which he has laboured for some time. I think it will be safe to predict that he will find that in the matter of removing the chippings the narrower the groove the greater the advantage the self-clearing revolving cutter of a rotary machine will have over the hand scraper used in connection with the Pick.

There is one fact overlooked by Mr. Firth in his frequent critical allusions to the large horse-power of the Monitor, I refer to the great surplus of power held in reserve which, if circumstances demand, can be brought out. As I have repeatedly stated 20 lbs. is the initial pressure used, and although 9 in. is the usual feed, 12 in. and in one instance 18 in. per minute have been cut without an increase in either pressure or engine speed. It is readily apparent that, the hardness of the coal permitting, 6 in. or even smaller cylinders could be introduced without any difficulty whatever, as the size (considered in regard to weight and space occupied) of the engines is not a vital feature in the construction of the machine; whether the cylinders be 6 in. or 9 in. the distribution of the parts upon the bedplate need not be materially affected. The coal, however, for which the present Monitor was specially designed is of a very hard and stubborn character, much more so than Mr. Firth is probably aware, and in the machine care was taken to combine great power and strength with compactness, portability, and facility of handling. There had, also, to be taken into consideration certain peculiarities in both the structure of the coal and the roofing, which peculiarities, by the way, would preclude the possibility of a percussion machine being used. Therefore, not having seen the machine in operation, and being in ignorance of the many difficulties peculiar to its particular field which the machine has had to overcome, it seems very absurd and presumptuous on the part of Mr. Firth to indulge in the flippant criticisms with which he embellishes his communications.

I cannot see that the size or character of the air-conveying pipe has any very direct connection with the subject under discussion further than that the lower the pressure the lighter and, consequently, less expensive the pipe required. In a former communication I believe I mentioned the fact that the Monitor's 175 yards of pipe had with advantage been increased to 3 in. This pipe is of wrought-iron, and much less costly than even the 2-in. size of the cast-iron flange-jointed pipe commonly used in Great Britain; therefore, expense cannot be urged as an objection to the 3-in. pipe in question. Out of his 9000 ft. of air travel Mr. Firth can make no argument in favour of small pipes unless he shows that the loss by friction is within the additional cost of larger pipes.

The "particular improvement" to which Mr. Firth refers in his last passage is to me a mystery, nor have I any recollection of making the confession alluded to in the same paragraph. The latter, like many other statements he has made during this controversy, was, no doubt, given recklessly and without deliberation, and although I do not like the word must be termed a great blunder on his part. To all those who have advanced the general cause of coal-cutting machinery in Great Britain I gave due credit in my original paper. It is true that I did not make special reference to Mr. Firth, but he must remember that until I learned of them through the present correspondence I had but little knowledge of his labours in this direction.—*Acapulco, Mexico, Dec. 31.*

J. S. ALEXANDER.

RECKLESS WASTE OF HUMAN LIFE.

SIR,—In justification of this heading it is necessary that I should quote a few facts which none can deny.

In the first place, all my arguments through the Journal bearing upon existing abuses to which may be fairly attributed the true cause of colliery explosions, are fully corroborated by the sworn testimony of the most scientific witnesses, all of whom admitted that the air supply had hitherto been insufficient to counteract the deadly effects of carburretted hydrogen emitted from the standard coal, &c. Such witnesses also bore unqualified testimony to another important fact—that an increased pressure, equivalent to only an ordinary atmosphere, upon the surface would not only lessen the danger, but probably effect a cure, provided it did not exceed a certain standard of speed, and that it could be equally spread throughout the ramifications of the pit.

All of these conditions I have abundantly proved to be not only within the range of possibility, but actually tested at the Montague Main Colliery, and every detail publicly certified by its owner. I have also proved that instead of an ordinary atmosphere being obtainable, as thus desired, a pressure of 16 lbs. to the inch was produced in this colliery without the slightest difficulty, and more if necessary. It has also been proved beyond the power of the most perverse and sceptical to subvert, that such a blessing can be secured at a much less cost than furnace ventilation; still, the admirers of the latter continue their preference for an enormous fire in an explosive element. I had reasonably hoped that in responding to the wishes of a few, expressed by letter, that I should detail my plans through your columns, such assumed friends would either approve or at once condemn my project with any epithet prompted by ignorance or superior judgment, but this, in either sense, they have studiously avoided. I still maintain my ground, however, and challenge them to the contest. If an unlimited supply of air can be secured there must be less danger in blasting, but instead of making this a condition for the use of any explosive to lessen labour, I find not only an exhaustive discussion from week to week as to the most economical and effectual destructive to be used, but not one word from these *savans* as to the necessity of increasing the presence of the only element calculated to diminish the danger of explosions by art. I laboured for years to obtain an Act for the appointment of Government Inspectors, and in my published "Review of Colliery Casualties—Money *versus* Life," a copy of which was sent to every member of the Government and Legislature, my object has not only been substantially accomplished, but my motives have been fully acknowledged by a majority of the newspaper press as disinterested and humane.

By the publication of "Fiery Facts" I fearlessly attacked the iniquitous "City Coal Tax," and proved that in return for millions sterling by which London had been metamorphosed, and the corporation enriched, not a solitary sovereign had ever been granted from the corporate funds towards the relief of either the widows or orphans of thousands slain in obtaining the coal so unrighteously taxed. By this I made enemies of personal friends amongst this wealthy class, and in none more so than the then Lord Mayor, Sir W. Cubit, still, it had a good effect in the miners' cause, as during the first month of its issue the Hartley catastrophe occurred, and the Mayor became foremost in the movement to induce public aid, when something like 40,000*l.* was subscribed through the Mansion House alone. I next established an institution in London for the general amelioration of the condition of the miners, and sought not in vain to teach them the necessity of rendering it beyond the scope of precarious charity by their own contributions. This was duly responded to, but quickly annihilated and split into fragmentary branches, to be managed or mismanaged by men of their own choice, in preference to noblemen and others of equal stability who had taken a warm interest in the cause. How some of these delegates nominated by the dupes have discharged their official functions your own columns have too clearly proved to be utterly disgraceful.

I have recapitulated some of the above facts merely to open the eyes of the disputants about dynamite, guncotton, or powder as the cheapest or best to add to the destruction of human life in collieries, that I am no stranger to the men themselves, and that if the disgraceful indifference hitherto manifested by owners and managers to the respectful appeal by myself for their opinion upon an apparent means of safety be still persevered in, and the dictates of humanity be disregarded, there is yet another means of rendering them decently humane upon compulsion. Surely the operatives have a right to know more of passing efforts to protect them than the information conveyed by a public journal eagerly perused by their superiors, but rarely seen by a labouring man.

When I attended the funeral of the Hartley victims, a sight which can never be effaced from my memory, I consented to address a meeting at Blyth a few days later, which was numerously attended. The publicity given to what I then and there stated not only led to my experiments at Montague Main Colliery, but in response one of the leaders present said "the very name of Mr. Colwell has brought much comfort to the hearts and hearths of many amongst us, including most of those so recently destroyed at Hartley." This is no idle boast, there may be many yet surviving in that district who have not forgotten this concise but feeling expression of gratitude for unrewarded humanity. Reverting from this digression back to the "reckless waste of human life," I would ask where are the professed friends and liberally paid advocates of the miners' cause? Whether in or out of Parliament they must be cognizant of all that appears in your valuable Journal, still even they have not condescended by word or deed to offer the slightest encouragement to my humble efforts, although I still possess their written testimonials of praise for the past and faithless promises to support me in my future labours on behalf of the helpless. Such dastardly conduct, coupled with the palpable indifference of owners and managers by their silence, are sufficient I hope to excuse any warmth of expression herein contained; and, in conclusion, I once more respectfully invite the attention of all concerned to my various contributions to your Journal during the past three months. The quietude of retirement during the last 14 years has refreshed me for renewed action, and I shall never forsake this cause of helplessness and oppression until something like justice be done at home and abroad.

Southtown, Yarmouth, March 21.

C. COLWELL.

PROSPECTS OF CORNISH MINING.

SIR,—I trust I shall not be considered intrusive if I solicit space in the Journal to offer a few remarks on the present position and future prospects of this important industry. The present position of tin mines is, undoubtedly, a critical one, owing to the serious competition occasioned by the great influx of Australian tin in the English market; and, consequently, great depreciation in the value of their produce, but it is nothing more than is often experienced in the metal market, being simply an excess of supply over demand, requiring only a little time to right itself, which from accounts as to ultimate requirements is decidedly favourable. But what I cannot understand is the great neglect on the part of the enterprising public towards copper mines and copper ground, and even lead mines and lead ground. It is well known that there is no kind of mining property pays better, and with considerably less outlay, than copper and lead mines, and were the capitalists to invest in this kind of enterprise they will find in the county an unexhaustible field of operation, but I would warn them against laying out their money in very deep mines, requiring heavy costs to work, with less chance of getting any remuneration for their outlay.

The parish of Gwennap some 30 years ago sent more copper into the market, and made greater profit than any district in the two western counties of Cornwall and Devon, but for the last few years, strange to say, has been neglected; there are, however, some few mines being carried on in the neighbourhood in new ground, which from present appearances will soon cause the district to spring into notoriety again. A little mine, called West Poldice, situate in the centre of the "hotbed" of this rich district, has within the last twelve months enhanced in market value from about 2000*l.* to 40,000*l.*, and must go considerably higher. I call it a little mine, for, like all the profitable mines of this county, it commenced on a small scale, progressing to a large and rich property. With an outlay from the shareholders of about 1000*l.*, it is now yielding about 750*l.* worth of mineral monthly, at a cost of about 500*l.*, and only 40 fms. below adit, with very little ground laid open in length, and that on one lode; other lodes are within an easy and workable distance from the present engine-shaft, which I presume will ere long be laid open by means of cross-cuts; they have been very rich both east and west of this ground, and when cut parallel to the bunch of ore now being developed analogous results are almost certain, thus laying open another section of mineral ground in the parish of Gwennap, viewing with those of past days, and from which vast riches have been made. There are others of like prospective value being opened (and without any flourish of trumpets from market circulars) likely within the next few months to have an equal market rise to the east; and on the same productive lodes is Wheal Unity Wood, just now getting down into the mineral-bearing ground, about 70 fms. below adit, where the lode is increasing in value, and now worth 80*l.* per fathom. The success of this undertaking is mainly due to the energy of the intelligent and enterprising manager. West Gorland, to the west of this run of mines, has been sunk from surface to about 50 fathoms deep on a masterly lode, producing large rocks of rich copper ore, having the appearance of being on the top of a rich deposit, but from some cause they seem afraid to penetrate it further. An outlay of about 1000*l.*, to put the shaft about 20 fms. deeper, will lay open another good paying mine in this famous district. Time will not now permit me to enlarge on this subject, but I hope at some future time to lay before your readers other instances of prospective discoveries, sufficing to show the world that the prospects of Cornish mining is by no means so dull as some people seem prone to look at it.

CHARLES BAWDEN.

Poldice House, St. Day, Scorrier, Cornwall, March 22.

THE SUCCESS OF MINING IS ITS GREAT ATTRACTION.

SIR,—Whatever may be said to the contrary the stimulus of mining is its success, and not so much as a satisfactory source of investment as an engaging and diversified field for speculative enterprise, the love of which imbues the spirit of our race, and excites an enthusiasm which is promotive of healthy intellectual activity. The nature of mining pre-supposes speculation, because its treasures are concealed in the dark recesses of the solid earth, and the bodily orb of vision, unassisted by the mental faculty of perception, is unable to trace its sources. It is step by step that man gains knowledge, and this is nowhere more true than in mining, where every newly-discovered fact becomes accretive. No man of any parts regards a natural fact as an isolation any further than is necessary for the contemplation of its own individual parts and general features. The moment these are understood its relation to other facts—those which are known as well as those which are merely apprehended—are enquired into, and the relations of each to the others sought to be ascertained and established. The respective localities of metalliferous minerals are usually easily discovered, although sometimes the precise boundaries of each are not so readily defined; but whilst the localities are indicated with sufficient clearness generally, the particular parts where the treasures lie hid are problems, which experimental mining alone can determine, and upon the skill of the miner, whether theoretical or practical, or a combination of both, as they are usually associated, will be the measure of his success or otherwise.

If Nature is a book for contemplation, as it is sometimes figuratively said to be, it has a language, and that language its symbols by which it may be interpreted. Its study, then, to be practically useful must first deal with its symbols simple and pure before their combinations can be attempted with much hope of success. But if Nature is a book it comprises three volumes on different subjects, each perfect in itself, and each characterised by symbols peculiar to its subject, upon the right interpretation of which useful indices may be formed by intellectual agencies for future reference and guidance in prosecuting further and fuller investigations into their mysteries. The botanist discovers the laws which govern the constitution of plants by observing the phenomena they exhibit at different periods and stages of their growth and development. In like manner the animal economy is studied. But the mineral kingdom, though requiring to be studied in a manner analogous to them, differs essentially from both. The two former deal with subjects which are found within the ken of visual comprehension, and may be examined from all points both externally and internally, and hence an opportunity is afforded of becoming acquainted with their several parts and the respective functions of each. In both these divisions of Nature the knowledge of one is the knowledge of all of the same type and class, and generalisations, therefrom, may be made with logical exactness. But not so in the mineral kingdom, although a process somewhat analogous has to be observed, but under vastly more difficult conditions. The objects of contemplation in this department are of a prodigious magnitude, and so disposed that only a comparatively small part of those which are visible can be seen by an observer, and hence his reasoning concerning them must necessarily take a wide range, and be content with conclusions which, though satisfactorily convincing to his own mind, may never admit of demonstration, and until facts are demonstrated they cannot be exalted beyond the province of theory.

After all that has been done during the lifetime of the most assiduous and elevated votary to the science of geology it has been found at its close that he has only succeeded more or less imperfectly in interpreting a very small portion of this vast volume. The science of geology is intensely interesting, and the facts it discloses adds greatly to the stock of human knowledge. It has also a tendency to enlarge and elevate the thought and conception of those devoted to its study to an extent which no other science except astronomy is capable of doing. But its range is a wide one, and numberless intervening objects escape its notice, whilst some others which do not are quite beyond its power to localise or define, except in a general sense, in the order of their classification. For instance, it is beyond the power of the geologist to afford much aid to the metallic miner, as his knowledge of metal-bearing rocks is derived rather from the disclosures of experimental mining than from abstract reasoning on the principles of his own science, and were known to the miner before geology as a science was introduced; the truth of which does not depend on my word merely, but has been also expressed by popular authorities, amongst whom may be named Mr. Robert Hunt and the late Mr. John Taylor; both of these gentlemen publicly stated that we know no more in this age of scientific research and attainments concerning the phenomenon of vein formation than did our forefathers, and if this be true, which I do not say it is, where is the vocation of geology in its application to and service of mining? If it does not enlighten us on this it teaches nothing we knew not before, but leaves to the individual understanding to interpret the facts of his observation and experience. The success of metallic mining depends on a minutiæ of detail, which vary in different localities, and are small indeed as compared with the facts and general features of the outer circles, so to speak, of the science of geology, and this it is which gives to it its intricacy, and demand for its successful prosecution the mastery of experimental knowledge. If this statement required illustration we need only refer to the quiet matter-of-fact way in which coal mines are prosecuted, and compare the expression of public sentiment between them and metallic mines, and it will be found that however remunerative the former may be to the proprietors they fail to excite the interest and kindle the enthusiasm which is produced by the latter, and this feeling is due to the estimation in which success under difficulties is regarded, and those which beset metallic mining are sometimes as puzzling to unravel as a tangled skein, and attended with an expenditure of time and money which sorely tries the endurance of men's most sustaining virtues—faith, hope, and patience; and is it to be wondered at that when success of an extraordinary kind is at

length achieved, transforming men from comparative poverty to affluence, it should exert an attractive influence on the minds of others most difficult to be resisted? Whether or not there is more speculation in metallic mining than in coal mining, it is generally understood that there is, and the interest which attaches to speculative enterprise will always be greater than that which relates to fully comprehensible investments, whilst the enthusiasm begotten by individual realisations in speculative pursuits, exceeding the utmost bounds of hope and sanguine expectations, will extend beyond its own immediate sphere, and sensibly affect others.

The progressive tendency of mankind is never more clearly seen than in the spirit of enterprise it displays. It is the something beyond the immediate grasp which impresses, though in indistinct outline, the mind, and impels it forward, inciting it to devise plans for the investment and realisation of its anticipated object. The bringing to light something that lay hid, and that something of intrinsic value in a commercial as well as a personal sense, is a proper and highly commendable object of ambition and encouragement, and when it is found to remunerate, as it sometimes does, a thousand and a thousand-fold its attractiveness then becomes almost irresistible. It has sometimes been compared to a lottery, and at others to gambling, but what resemblance it has to either I am unable to perceive. True, it excites with a force as great as either, but does not necessarily share their objectionable features. If one of the parties to a mining enterprise wins, all win in proportionate to the respective contributions made to its working, and if one loses all lose in a similar proportion. As to gambling, there is no commercial commodity that may not be played for in that way; and if mining stocks are bought and sold on the chances of a change in their market value that is a speculation altogether beyond the province of mining, and very often practised with no reference whatever to its intrinsic or prospective conditions. The excitement of market operations in dealing with mining stocks may sometimes rise to a feverish and bewildering pitch, but with what propriety can that be said in any but a remotely relative sense to be connected with mining.

Llanrwst Lead Mines, March 14. ROBT. KNAPP.

RATING OF MINES.

SIR,—Mr. Thos. Fenwick Hedley gives us, in the *Mining Jonrnal* of last week, his views upon this very troublesome question. Mr. Hedley evidently speaks "as one with authority" on the subject, and no doubt he feels it; but I should like him to tell us, through the Journal, whether he would or would not recommend some legislative interference with the present system of professional evidence in ascertaining the true and just value of the property to be rated? In a recent case in Leicestershire, respecting the professional witnesses, it came out in evidence that the system pursued by this class of worthy men is to base their remuneration not on the time occupied, but upon the amount of the rating obtained, and this was sadly denounced by the counsel for the mineowner, as in every way unfair and objectionable. Very properly the magistrates took the same view of the matter, and exhibited their opinion of such conduct by disbelieving every word the viewers had offered to the Bench, and fixed the rating at about half the amount sworn to by them. I say, if this be true, their statements ought to be taken with great caution. ARGUS.

INDUSTRIES OF CALSTOCK.

SIR,—Having spent several weeks in the neighbourhood of Calstock, I visited most of the mines and other works in that parish, and the contiguous parishes of Stoke Climsland and Callington. Since I first became somewhat acquainted with the district, in 1848, several new industries, or new works, have sprung up, which deserve to be noticed in the Journal. I intend, therefore, to send to you shortly, for insertion, notices of all the mines and works in that district. The East Cornwall Minerals Railway, which extends from Calstock to Kelly Bray, is of great importance to the mines, &c., by cheapening the transit of goods to and from the numerous points of operation; and a Bill is now before Parliament for the extension of this line across the Tamar to Tavistock, to connect with the narrow gauge line to Exeter and Plymouth. At present the gauge of the East Cornwall Minerals Railway is 3 ft. 6 in., but it will be altered in due time to 4 feet 8½ inches. I regret to say that the Great Western Railway Company are opposing the Bill. The New Consols. Emmens United Mines, the numerous other mines, arsenic works, &c., are deserving a record in your widely-circulated paper.

March 21. R. SYMONS.

DEVON GREAT CONSOLS.

SIR,—In the year 1848, when Devon Great Consols was a rich young mine, and in that year I first visited the locality, many persons said that the main lode there would fail in depth; that mines yielding riches at shallow levels, as a rule, soon became poor, and instances were adduced in support of that opinion. I held a different opinion, and in a letter inserted in your Journal about that time I said that I believed that "Devon Great Consols would be rich in old age." The first lease of 21 years has expired, and a second lease of 21 years is elapsing, so that old age is approaching, if not already reached. The mine after yielding considerably over a million sterling in profits to the company has for a time ceased to give profits, but the present condition of the mine is such as to justify a belief that ere long dividends will be resumed and long continued. It is true that the yield of copper ore has in a large measure fallen off, but the returns of arsenic, &c., are very considerable, which added to the copper ore will without doubt very shortly enable the directors to re-declare dividends. This is a singular mine, which from an outlay of 1*l.* per 1048th share paid such a vast sum to the shareholders, but I see from the Journal that the shares are now quoted at 4½, apparently a very low price for a property with such prospects. The discoverer of this rich mine—Mr. J. H. Hichins—is still alive, and Capt. Richards, who took the management at the formation of the company, or shortly after, I am pleased to find is still at his post.

Truro, March 21. R. SYMONS.

NEW CONSOLS—THE NEW VANNER.

SIR,—A meeting of practical engineers, managers of mines, and scientific gentlemen, was convened at New Consols on Monday, the 13th inst., to witness the trial of the Frue vanning machine, or concentrator, which was erected there by the inventor's representative that its efficacy might be tested. All the witnesses of its execution were satisfied of its superior utility as a separator of tin from the debris as they came in conjunction from the stamping mill, although from the temporary character of the machine, and the irregularity of the feed, it did not at first fairly exhibit its perfection. However, before it stopped, a sample of the tin was vanned on a shovel, and I perceived that no waste remained. Of all the numerous inventions for the purpose of separating tin from the associated materials this appears to be the most perfect. Its superiority consists in its vanning principle. It is said that there can be no better separation than that effected by the common process of vanning on a shovel, and the machine is a huge vanner. I have no doubt that when its excellence becomes generally known its general adoption will follow in tin mines everywhere. I understand that the managers of New Consols, who are thoroughly satisfied of its efficiency, are about to erect one or more on that mine. The inventor, Mr. Frue, has incurred great expense in bringing his machine to perfection, and I hope that he will be amply rewarded.

Truro, March 21. R. SYMONS.

PENNERLEY MINE.

SIR,—Subsequent events have shown that the writer of a letter in last week's Journal, signed "Shareholder," rushed needlessly into print, whether for selfish purposes or in mistaken kindness we shall probably never know. Certain it is that the price of the shares has fallen from 3*l.* to 2*l.*, although the report to-day from the mine announces the expected improvement in Potter's Pit, and those who followed the advice of "Shareholder" now, doubtless, regret it. Much more valuable than any shareholder's letter puffing up the mine, and recommending holders not to sell, would be a statement in the columns of your valuable Journal from the manager and directors showing the expected result from the present discovery, how much ore, and the value, has been obtained since the discovery, what prospects for a continuance of its present value, and upon this estimate what will be the probable monthly sales, and what dividend this would give. I know the many objections which the directors could raise to my suggestion, but I also know that they are in a much better position to give us information than "Shareholder," who ventures to state "150 tons, at least," as the probable monthly get. Anything the directors can tell us will be something on which we could in some measure rely, and if in issuing a prospectus of a new company they would not hesitate to make and publish calculations of probable results long before any lode was discovered.

The questions are—Will the working of the present discoveries do more than pay cost? Will there be anything saved for dividends to shareholders? I see by Mr. Murchison's pamphlet, just issued, that ore has been sold in past years by this company amounting to upwards of 50,000*l.* How much of this came to the shareholders?—*March* 23. ANOTHER SHAREHOLDER.

PENSTRUTHAL MINE, AND ITS MANAGEMENT.

SIR,—This mine, working on the Highburrow lode, &c., must again see better days, and receive favourable public notice from investors. Having a large balance in hand (about 14,000*l.* odd), it differs from most Cornish mines, and is well able for many years to come to hold its own against any and every tin depression—a better figure for tin means much prosperity for Penstruthal. This mine is situated in the heart of the best and richest districts of the Redruth group of mineral properties. A strong recommendation of the mine consists of the example furnished in former workings on a parallel copper lode, when no less than 80,000*l.* profits were realised, copper not being nearly so good on the market. It is remarkable that copper is now coming into the workings (already worth 1 ton per fathom in one part), and a course of ore is daily expected in the lower levels; this is the opinion of Capt. W. Teague. A rise in the tin market of importance (sooner or later this must be) would cause all to become *couleur de rose* with this adventure. In event of a complete success of the Frue Vanning dressing apparatus—a fact not to be doubted, indeed already accomplished—the directors of this company must see the immediate necessity of adopting it on a large scale in the future production of tin. This machine must be universally used throughout Cornwall, being applicable for all metals at one operation, and thus enabling the Cornish mines to produce minerals at a great saving. It is to copper ore Penstruthal may also look for large and profitable returns, especially at the deeper levels. The tin ore may remain unworked even until an (expected) improvement in the market arrives. The copper lode is known to go down almost in a perpendicular direction, close to and parallel with the shaft; the levels to be driven will, therefore, be very short indeed. The present price of 7*s.* or 8*s.* per share is no quotation for the mine, for the future prospects are very satisfactory. All investments in Cornish tin mines are unduly depressed just now, the good investments suffering with the indifferent, and Penstruthal securities are worth looking up just at the present time also, for there is a very fair chance of the shares seeing a par quotation ere long, and a much higher figure should copper ore enter richly into the workings. A success in Penstruthal would do much to restore confidence in Cornish tin and copper mines, and become a stimulus to the market. A 59 fm. level is about to be driven immediately to cut the lode of copper ore (the deepest level as yet), and to be proved in value. At a 100 fm. level Penstruthal Mine will be one of the wealthiest properties in Cornwall. It has certainly, it is to be hoped, seen its very worst days.

CORNISH VIATOR.

GOLD IN WALES—No. XXIII.

DOLGELLEY DISTRICT—TWDDYNGLWADIS SECTION *(continued)*.

TWDDYNGLWADIS MINE *(continued)*.

MR. EZEKIEL WILLIAMSON (June 30, 1864) reported:—"Crossing the river and traversing both setts, Cwmheisian Isaf and Tyddynglwadis, are some 12 or 14 lodes. Four of these are opened and wrought by adits from 40 to 400 yards in length. Three of these lodes, however, will furnish matter enough for my present report, leaving the others until a more minute inspection is made and samples assayed.—Tyddynglwadis Sett: Main lode: This lode is opened on by three adits—No. 1, or the deep adit; No. 2, or the middle adit; No. 3, or the top adit.—Deep Adit: The deep shaft has been sunk 9 ft, making the total depth 109 ft. A short adit is driven from the bottom in a north-west direction on the lode. The lode both in shaft and level is very poor; it only showed occasional spots of blende and copper ores; it did improve greatly in driving the short adit, and presents in the end a kindly-looking appearance. About 20 yards from the present forebreast in the deep adit a channel of very soft ground crosses the lode. The lode makes some pretty lead in places; but where we were working the ground was so jointy and dangerous, and the lead so divided into small nests or pockets, that I did not think it worth our while to keep on opening the ground here; so I put the men to work in the end of an old stope a little nearer the deep shaft, where the lode seems to bosset up against the soft channel of ground.

We got some splendid silver-lead here, some of which was encrusted with a thin film of native silver. You have a specimen in your office. We also got a quantity of very fine blende; we noticed nothing in it at that time, but I have since discovered a very rich silver ore in this blende, having a character somewhat similar to that of the German fahlerz. A specimen which I assayed gave at the rate of 3528 ozs. of silver to the ton of ore. I have assayed another sample since then, and got a similar result. I also made an assay of a stone just as it came from the mine; it showed several spots of grey ore in a matrix of carbonate of lime. I got out at the rate of 278 ozs. 2 dwts. 4 grs. of fine silver, and 2 ozs. 0 dwts. 20 grs. of gold to the ton of ore. The shales also in this adit give gold; some assays gave as much as 13 dwts. of gold to the ton. If it is found that the whole of the shales give gold in the above proportion we shall certainly have a very rich mine for gold. There are three other stopes and three shafts which have not been wrought since I have been here. In one of these shafts, which was sunk a depth of 20 yards below the deep adit, out of this 20 yards there were 15 yards of very good ore, the ends of which are still standing in the shaft. I should recommend you to empty this shaft and stope away the ends for the silver-lead and blende, and to carefully note the produce. This shaft is just under the stope where the rich silver ore came from, so there is a probability of the ore being very rich.

No. 2, or middle adit, bears a similar character to No. 1, or the deep adit. The end of this level is blocked up by the old waste, which prevents my examining it to the forebreast. I should recommend that this stuff be at once taken away, and a thorough examination made for the whole length. I have found some very strong and pretty stones of lead and blende in the old heaps outside, in which I have found spots and traces of the same grey ore that makes such rich silver in the level below, the assays of which are stated in the list. The No. 3, or the top adit, cannot be examined, the top of the level having fallen in. Some excellent lead was found here at the time the mine was last worked. I have found a spot of the silver ore in the hard white quartz.—Powder House Lode: This lode has been driven upon some 4 or 5 fms.; it shows very strong in the end, and it is my belief that we have not yet seen the best part of the lode, which I think still stands behind what we have hitherto called the heading wall of the lode. A result by assay is given in the list.

Cwmheisian Isaf.—Bridge Lode: This level has been driven on for some 15 fms.; for part of the length the lode shows a very kindly appearance, and in a small sink, about 5 ft. deep, the lode shows some strong ribs of lead and blende, each from 1 to 2 in. wide. A little further on than this sink the lode has gone south, and the old people having driven the level straight have left the lode and driven into the country slate. A little cross cut was put in, but the men were stopped before the lode was reached.—Large Adit: This is a continuation of the Tyddynglwadis main lode, but it is devoid of its shales and clays, and the configuration of the lode channel is of such a barren character that I think nothing can ever be expected here.—No. 2 Adit: This lode is opened upon opposite the powder-house lode, and is probably a continuation of that lode. Some very nice patches of ore have been passed through, but not of sufficient value to notice. In the middle of the level is a lode showing very strong mundic. I put two men to work here, and got a ton of this mundic. I calcined about 5 cwts., and worked 300 lbs. in the little Britten. I have not retorted the whole, but I retorted the mercury after the first 50 lbs. of stuff was worked, and got a small prill of gold. I do not think this sett possesses a character sufficiently valuable for its further development; it has the same lode as the Tyddynglwadis Mine, but not the same ground. The stratum on this side is hard clay slate, with interbedded greenstones. The same elvan that so enriches the Tyddynglwadis lode enters this sett, but soon swells and loses its character as a lode, elvan joining and forming part of the immense ridge of greenstone that caps North Dolfrwynog.

The Tyddynglwadis sett is made up of long dykes of greenstone, with channels of clay-slate. This slate passes imperceptibly in places into a lode, slate carrying copper and mundic with gold occasionally found in the native state. Near to the boundary of Cefnlyddwr, and running parallel with the whole sett, is the junction line of the Cambrian rocks with the lingula beds of the Lower Silurian. In the middle of the set, and adjoining the junction line, is a basin-shaped hollow, into which all the lodes seem to make. The Cwmheisian lead lode, the Tyddynglwadis main lode, the channel of the powder-house lode, the gold lode, and the slaty channel all seem to bosset together up against the Cambrian rock in the above-named basin. If anywhere, therefore, this is the place to look for a good deposit of ore; and the chances are that if a bunch is found it will prove rich, owing to its peculiarly interesting situation, and from the fact that nearly all the rich discoveries have been made on this junction line.

Surface: On the surface the crushing-mill and sieves are in excellent repair, and are capable of doing a lot of work. We have six head of Cornish stamps ready for work, and the German lead dressing machines. These machines are very good for the richer ores, but will not do for stuff that contains a small percentage of lead; they are too slow in operation. Our slime pits are very deficient. I would strongly recommend your attention here, because some of these slimes are very rich in gold and silver, the lightest slime, curiously enough, is always the richest in the precious metals."

List of assays made by Mr. E. Williamson at the mine, June, 1864:—

No.	Gold per ton. ozs.	dwts.	grs.	Silver per ton. ozs.	dwts.	grs.
1. Blende from deep level, 300 yards in	0	14	6	7	0	12
2. Blende and galena, end of bottom stope, broken by Capt. Nancarrow	3	12	0	141	5	12
3. Shale from same stope	0	13	6	0	19	0
4. Blende, &c., from same stope	0	16	8	2	9	0
5. Black shale from ditto	0	13	1	0	3	7
6. Blende and galena, broken from the top of the highest stope, N.W. end, by Capt. Nancarrow	3	5	8	29	8	0
7. Galena, with blende from the River lode, Cwmheisian Isaf	0	8	4	15	6	4
8. Blende, with arsenical pyrites, from ditto	0	6	12	4	7	12
9. Blende and galena, &c., from Powder-house lode	0	11	12	23	18	12
10. Galena and iron pyrites, Cwmheisian Isaf	0	13	8	7	6	17
11. Ditto ditto ditto	0	10	21	50	8	7
12. Blende, &c., from No. 2 adit, Tyddynglwadis	1	15	22	29	5	2
13. Blende and galena ditto ditto	2	9	0	25	14	12
14. Stone of silver ore taken from heap on dressing-floor	2	0	20	278	2	4
15. Stone of silver ore from No. 2 adit	0	19	6	104	12	15
16. Blende, galena, and silver ore from ditto	0	12	6	42	5	6
17. Blende from ditto	0	13	1	21	7	23
18. Copper pyrites from top adit	3	2	0	41	8	4
19. Iron pyrites, blende, and galena from No. 2 adit	0	14	8	7	9	0
20. Grey silver ore from stope in deep adit				3528	0	0

240 grs. gave 27 grs. of silver; alloyed with gold, quantity not ascertained.

MR. E. WILLIAMSON (Nov. 3, 1864) reported:—The following is a report of our progress since the general meeting:—It being recommended by Mr. Dean that one of the shallow adits should be extended, so as to cut the lode at its junction with the Cwmheisian lead lode under the bog marked C on his plan, I prepared the second adit, so that his advice might be acted upon in the cheapest manner. I cut the sides of the level down, so as to admit a tram-wagon, and laid down rails to the end of the level, a distance of 196 yards. To ventilate this end I dammed up the arch of ground in the top adit, and made it into a reservoir, and brought down a run of 6 in. wooden pipes through the first rise, marked No. 1 on the plan, to a double tank fixed in the back of the second adit. This is what is called a water-machine, and will supply air to drive 200 fathoms. To prepare for the transit of ores that might be broken in the second adit to the dressing-floor, I eased up the old shaft that forms a communication with the bottom and second adits, and made it into a pass, so that the stuff is thrown down at once into the wagons below without further trouble. I set men to drive the end at 6*l.* 10*s.* a fathom, and drove 18 ft. 9 in. The ground throughout this length was of good character, though very poor, a little galena showing only on the footwall. I advise this end to be stopped, and to costean the lodes at different points, and to sink a trial pit at the place where the Cwmheisian lode is supposed to join it; this would be a quicker and cheaper mode of trying the lode. Nothing would be lost by what has been prepared in the second adit, for if the trials proved well and the level worth extending everything would be ready for working at once; if otherwise, there is a length of 50 fathoms of backs in the second adit that will pay for stoping, so the tramway, the ventilation, and the pass would be used by the stopers. I have stoped 8 fms. 1 ft. of the backs in the second adit at 30*s.* a fathom. The quality of the lode varies very much. In some places the place would show a string of blende 5 or 6 in. wide, nearly solid, whilst the next shot would, perhaps, take it all out, and show a very poor lode, when very likely the shot after would show the lode as rich as ever, and so on, varying considerably every foot of ground. This work is now stopped for want of timber.

Bottom Adit: We have here two stopes, Nos. 1 and 2 on the plan. Both are stopped whilst all stuff containing blende and lead is being trammed from beyond No. 1 stope. When No. 1 stope is cleared I will set it to six men, in the hope of getting a good supply ore. No. 1 stope yields very good silver-lead and blende, showing more regular than at any other place on the mine. The richest part of the lode was near a small cross-course. On leaving this cross-course the lode became poorer. A very hard quartz, filled with iron pyrites, took the place of the soft shales that were so rich in lead, and the filmy tetrahedrite at the cross-course. I am going to explore this sulphury quartz on account of the silver ore mixed with it. No. 2 stope yielded very good lead for the first 3 ft.; it then cut out, and very little was to be seen in the forebreast. We cut through the hanging-wall, and found a lode with a small quantity of lead and zinc ores. It showed very well for silver, but would not pay for working as we left it; but as I stated before, the ground is so changeable in its nature that the next shot might show a very rich lode.

Surface.—We have fitted the stamps with strakes and blankets, in order, if possible, to catch the silver. We are also making a 6 ft. water-wheel and round buddle, so that we may re-stamp all the old tailings and dress them for the lead and blende they contain. We have also put in a new crushing roller, and arranged the crusher so that we can crush either wet or dry. We have now in the lead-house about 54 cwts. of No. 1 quality of lead ore, 12 cwts. of No. 2 quality, 31 cwts. of blende and lead, and 86 cwts. of silver ore. Samples of the lead and blende ores have been sent to Bagillt, but the silver ore has not yet been sampled.

MR. E. WILLIAMSON (Dec. 1, 1864) wrote:—"I sent the samples of the silver ore and blende to Bagillt some weeks ago. I expect to make the lead and blende up as follows:—First quality, 3 tons; second ditto, 1 ton; third quality lead and blende, 2 tons; first in silver ore, 14 cwts; second ditto, 4 tons 6 cwts.=10 tons. To this we may add 1 ton of copper ore 8 or 10 per cent., 2 tons of blende and silver ore, and 2 tons of silver ore."

MR. FREDERICK BENNETT (Dec. 7, 1864) wrote as follows:—"The Tyddynglwadis silver ores forwarded for assay have been assayed for silver-lead and gold by Mr. Arthur Reynolds with the following result:—No. 1, silver, 44 ozs. 9 dwts. per ton; lead, 6·75 per cent.; gold, none. No. 2, silver, 5 ozs. 4 dwts. per ton; lead, 2 per cent.; gold, none. With regard to valuation I find it difficult to do so, but, of course, if we could have a large quantity of such ores we might work them advantageously; I should say, however, that No. 1 would be worth about 9*l.* per ton for lead, and that No. 2 would not be worth consideration." T. A. READWIN.

March 21. *(To be continued.)*

MINING IN CARDIGANSHIRE.

SIR,—I have inspected the Ystumtean Mine, and sent my report to the right place, I suppose. I hope they may follow my advice, and I have no doubt of the result. This mine (as I have many times alluded to) is almost the most western mine being worked on the great champion lode running through the counties of Montgomery and Cardigan, now known as the Van lode. Although there is sufficient land to the west of this mine, which fortunately has fallen into my hands by paying dearly for it, it is the key to all the eastern mines for miles long, and without this piece of ground being worked the lode in the range of mines from the far east to the mine first brought to notice in my letter will never be thoroughly proved. I would in speaking of this ground class two mines into one noble sett—so that one measuring, setting, and pay-day may do for the whole; also, being so near, one and the same agent, under the supervision of some good managing engineer—and this good property would become one of the first mines in the county of Cardigan. I believe it is to be called the Rheidol United Silver-Lead Mines. It is up the valley from Aberystwith sea-port town about 10 miles, good road, the River Rheidol running along under its banks close by—so that carriages or wagons of any size or shape may call that way, and behold for themselves the wonderful improvement it would make by the amalgamating of the whole into one first-class mine. I hold reports from most of the principal Cardiganshire mining engineers of long standing, and of great mining experience; and if such persons cannot be relied upon and believed, it is time legitimate and honest mining should cease. These are just the outlines of the whereabouts of the property. There are scores of tons of high-price blende already brought to surface, in consequence of the price of this mineral at one time, and that not long ago, being so very low as not to pay for its carriage to the station. Now it is worth varying from 5*l.* to 7*l.* per ton; and I may truly say that sufficient blende could be raised and sold to cover all expenses, and leave a nice little monthly profit for any emergency. It is not for blende alone, but for lead I push on; lead of the very best quality—and lead will be found before many more fathoms have been driven or sunk in depth.

To the Ystumtean Mine belongs a little mine worth writing about. From the surface to the adit level, which is their present depth, is about 50 to 60 fathoms; descending from the surface through the old workings, you meet level after level, stope after stope; nothing of any shape or form, as all the ground has been worked away from time to time; even to the present moment no new ground has been laid upon, and how they have managed to send so many tons of lead from this mine I know not, unless it is, as Mr. Green says, by their new and successful machinery. More than this I never saw. It is worth while trying such a perfect way of cleansing and extracting mineral from old stulls, for I see no ore underground, except in two or three places; evidently nothing is going to waste. I hope they may succeed, and have a good mine. When I may look about in the western concern, and take all the dips of their several lodes, underlaying as they do to the south, and every shoot or bunch dipping fast to the west, and, taking all things into consideration, I do not think that anything in the county has ever yet been brought out to greater advantage to the mining community at large than the Rheidol United Silver-Lead Mines, Cardiganshire.

SAMPSON TREVETHAN, C.M.E.

PESTARENA UNITED GOLD MINING COMPANY.

Sir,—I have no doubt that many shareholders in this company, like myself, long ago made up their minds that there was no hope of ever receiving a penny on the capital invested in this concern. The reports issued during the past two or three years showed that money was being laid out on new machinery, &c., and that the sales of gold were stopped. This naturally drained the company of its funds, and it has been necessary, as I understand, to borrow a sum of money on debentures to pay the company's liabilities. This seems to be a gloomy prospect. I am glad, however, to find that there is yet hope for us. For some time past I have been carefully watching the reports published in your valuable Journal, and I find that there is a considerable improvement in the state of things. For since the autumn of last year raising of gold has been resumed, a gradual increase taking place in the quantity monthly; and, what is more important, the average produce of the ore is much higher, the last reported being over 15 dwts. to the ton. Now, as far as I know, there is no gold company that can show such a good yield except St. John del Rey. The Val Toppa Mine is, I am told, working at a profit of 400*l.* a month, and shortly the new machinery at Pestarena will be in full operation, when good returns may be expected from there. I am anxious that my fellow-shareholders should have this "cheery news." "It is a long lane that has no turning." Has the "turning" been reached by this company? A SHAREHOLDER.

LINARES, FORTUNA, AND ALAMILLOS MINES.

SIR,—Now that foreign loans have fallen into disrepute, and railway shares are receding almost every day, many investors must be at a loss to know where to find a field for the employment of their capital which shall be at once safe and remunerative. It may appear somewhat ironical to speak of any mine or mines answering that description, but I am about to refer to three mining properties which certainly are highly remunerative, and, in my opinion, perfectly safe. I allude to the Linares, the Fortuna, and the Alamillos Lead Mines, situated in the rich mining district of Linares, in Spain. These mines have for a number of years been making large profits; and, so far from being exhausted, the mines are increasing in value, and the dividends are becoming larger still. Of the permanent character of these mines there cannot be a doubt, and there is no reason why they should not continue to make large profits for many years to come. The half-yearly dividends just declared, and payable on April 1, yield at the present market price of the shares as follows:—Linares, 20 per cent.; Fortuna, 15½ per cent.; and Alamillos, 11½ per cent. per annum. Tempting stocks for investors these! The regularity with which the dividends are paid is, for mining companies, really remarkable; and, further to strengthen the position of the companies, and to provide against contingencies, the directors have established a reserve fund, which is invested in Consols, and augmented every half-year by a sum written off from the profits. The managers are Messrs. John Taylor and Sons, whose name is a sufficient guarantee that the mines are well and honestly managed.

Investors would do well to make a few enquires about these companies, for the shares (particularly Linares) are undoubtedly the cheapest at present quoted on the Stock Exchange. OBSERVER.

[For remainder of Original Correspondence, see to-day's Journal.]

HANGMAN BURROW—THE WILD DUCK.

A little to the east of Hangman Burrow there is a level spot in part of the "Nine Maiden Downs" where the boundaries of four parishes join, so that a person may almost stand at the same time in the parishes of Wendron, Crowan, Illogan, and Camborne. This was the ancient site of many hurling matches, and bloody fights for the "silver ball" with the inhabitants of the above-named parishes, and Jan Temby says "that nine maidens for dancing on a Sunday were turned into nine moonstone posses, which every time they hear the cock crow dance all over the Nine Maiden Downs." Very few, I presume, will question Jan's statement. Soon after the "fox hunt" Jan Temby and the old comrades met at the "Wild Duck," kept by Cousin Will. After drinking several quarts of beer, and finishing the corners of phogans and pasties left from Crowst, it was agreed to ask Cousin Will to come in and have some discourse about mines, &c. "But look here," says Jemmy Dowa, "'tes no use to ax Cousin Will to come in to drink a waddle of cowld beer." So at last it was settled to have a tankard of "haalf and haalf toddy, with a bit of lemon peel in 'un." Cousin Will came in, and Uncle Henry Taylor said, "Set down, landlord, we are very glad to see 'ee. We wor helping the timbermen to-day, and mean to spend all our stems." "It is a good old custom," says the landlord, "and you are right to keep it up." "We had a discourse the other day," says Jan Jewill, "about the Gwennap lodes going west, and as you are a great traveller, landlord, we should be fine and glad to have your opinion of this here district all about." "Well," says Cousin Will, "as you say, I have travelled a little and worked in the mines of Shetland and the Orkneys, &c." "Dear me," says little Jan Temby, "is that so fur off as London?" "It's a thousand miles beyond London," says Cousin Will, "and for great part of the year there is no night or day there." "And how could you see to work?" asked Uncle Henry. "We had plenty of light," Cousin Will said, "from the North Pole, and it was a fine country to live in." "I don't doubt it," says Jan Temby, "but for my part I'd rather live on the Nine Maiden Downs, 'pon my sist; but 'ess the ground anything like 'tes here?" "In some places," says Cousin Will, "we found granite, &c., but there, as here, when we found the fine hard-grained moorstone we had no mineral." "Oh! my dear," said Jemmy Dowa, "when a man have split so many moorstone posses as I have with 'spletters and tearers' he would never expect to find mines in moorstone; but look out for a good rubbly growan that waa'nt split, with keenly elvans running through 'un, and you will be sure to find good bals."

"You forgot something Jemmy," said cousin Will. "What ess a says Jemmy?" "Powerful cross-courses, my friend, for let me tell you," says cousin Will, "without the great cross-course running south through Tuckingmill, and dividing Cook's Kitchen from Dolcoath, and on through Brea, Cannarton, Forest Moor, &c., and forming a valley or channel for miles. I say, without this great cross-course, which Jolly Tom said played the devil with all the quarries in Brea Valley, you would not have had the Setons, Croftys, Dolcoath, Cook's Kitchen, Bassets, Grenvilles, Condurrows, Frances, &c.; and why, let me ask, cannot this great cross-course be traced beyond the south end of Bolenowe Moor? The great valley ceases there. What is the cause? All the streams from the bend of this moor flow north until they reach Gwithian Bay, whereas beyond the bend of this, now about 1 mile, the streams flow south and reach the sea not far from the Lizard. There is no high mountain ridge dividing and causing the streams from this district to flow north and south, but there must be a cause."

"To be sure there ess," says Jan Temby, "and I'll tell ee what it ess; but knack, Jemmy, for before I begin my story we must have some more toddy. Here, young woman, bring another tankard of toddy—same sort as the last, only put a little more sugar and lemon peel in un. Now, landlord and comrades, you all know where Jemmy Trusty used to live; well, there is the beginning of the Nine Maiden Downs, and just below that house there is a end of the great valley going south—what I say was made by the great cross-course. Now, did the cross-course stop there, or did a still go south; and ef a es still going south, why dedn't a make a valley the same as before? You shall have my opinion, and ef you can beat'n do so. You all know that from Blue Stone Downs, west to the foot of Hangman Burrow Hill, there is a channel of moorstone as 'Becky' said that squeezed the life out of the Gwennap lodes going west for some distance; now, that same channel of moorstone squeezed the life out of the great cross-course, too, going south, and that's the way a can't be seen and the valley stopped where a ded. That's plain enuff to me, and can enny of ee say it es'nt so? But I'll tell ee a little more; east and west of Forest and Bolenowe Moor, Uncle Abram Benner cut a lot of beautiful lodes by dowsing, and so ded Uncle Henry's son Tommy; and so sure as we are drinking this toddy—a esn't all out again, ess a? we'll have another tankard and caal the reckoning—so sure will rich bals be found in that run of ground." "Well done Jan," say, Jemmy Down, "thee'st done a first-rate job, and I'll agree we'll all meet here again next pay-day, and have a drawbridge roasted pon taties." "Landlord, as this is to be the case I shall be a tankard for good will, and when we meet again I may give you a further account of my travels."—*Cousin Jack's Unpublished M.S.*

USE OF SLACK IN CUPOLAS.—An important improvement in the working of cupolas has been introduced at the Edgar Thomson Steel-works, in Pennsylvania, as the result of the ingenuity of the superintendent, Mr. William Jones. There had, it appears, been some difficulty with the cupola scaffolding, and retarded the work. To remove the scaffold Mr. Jones conceived the idea of forcing fresh fuel through the tuyere-holes, and thus melting down the salamander. Having taken out the tuyere-pipe, he rammed in as much small coal as possible, and again put on the blast. The effect was that in a few minutes the entire scaffold was removed, and the work proceeded as usual. To prevent further delay from scaffolding Mr. Jones has perforated the blast-pipe, and now infuses into the blast a portion of small coal, which is carried by the blast through the tuyeres into the cupola. There has been no scaffolding since this change was made, and the working is so much improved that twice the quantity of iron is dealt with in the same time. But this is not the most important advantage secured by this invention. It is well known to metallurgists that the great waste of iron in melting in a cupola occurs at the zone of the tuyeres, on account of the immense amount of air blown in, and the absence of carbonic oxide at that point. What little carbon the air comes in contact with at this point forms carbonic acid, which is almost as destructive to the iron as free oxygen. The principal waste of the metal occurs after its fusion and in its passage through this carbonic acid and atmosphere. By the injection of the fine coal with the blast its combustion is secured at the zone of the tuyeres, producing carbonic oxide, and thus preventing the oxidation of the descending metal. The descending column of coke and metal retards the upward flight of the coal, consequently it is projected downward, and forms a protecting covering on the face of the liquid metal and prevents its oxidation. It is remarked that Mr. Jones's process not only saves the waste of iron, but it also transmits to the converter a much larger percentage of the carbon which the pig contains, a very important consideration. In conclusion, this improvement is not limited to the Bessemer process, but would be of great value in all cupolas for melting iron for castings, as the great difficulty in that line is that the carbon is burned out of the metal, making it hard. With this process not only is loss of metal avoided, but the metal runs more fluid, and produces finer castings.

BENDING METAL PIPE.—The invention of Mr. M. L. ORUM, of Philadelphia, U.S., consists in a flexible mandrel for bending round metal pipe formed of a spiral coil of wire, which is flat or flattened on the exterior of the spiral, also in a flexible mandrel for bending square metal pipe composed of a spiral coil of wire, and two flexible plates of metal interposed between the coil and the sides of the pipe to be bent.

Meetings of Public Companies.

VAN MINING COMPANY.

The annual meeting of shareholders was held at the mine on Wednesday, Mr. WILLIAM PAGE in the chair.

The SECRETARY having read the notice convening the meeting, the directors' report and statement of accounts, as issued, were taken as read.

The CHAIRMAN stated that the accounts, &c., were so full that it was hardly necessary to do more than allude to them. He would, however, refer to the expenditure, and say that besides the item of 2344*l.* charged for machinery there had been expended a further 7000*l.*, or 8000*l.* for new reservoir, new cottages, reconstructing dressing-floors, &c., which had been charged under the head of cost-sheets. Another item was the entry of 1500*l.* for taxes. It appeared that under the Metalliferous Mines Act lately passed we had become liable for taxes, &c., not hitherto paid. To the principle upon which the company was assessed the directors objected, and appealed, as they were not only assessed under the new Act, but also under an old Act passed in the reign of Elizabeth, which included, besides royalty, engines, houses, and all erections. This appeal will be heard in course of a month or so, but the amount written off on this account will, the board think, meet the case. Should the company be successful it will reduce the item by 300*l.* or 400*l.*, though in any case it will appear in the future as an annual charge. I do not know there is anything else to which I need direct your attention, except that the directors have it in contemplation to redress the halvans, but the shareholders must not expect anything this year, though it may be an important annual item in future. The shareholders will have observed that the gross receipts have been larger this year by about 20,000*l.*, arising from larger produce, and higher prices obtained, and this had enabled the directors to pay 8500*l.* more in dividend, and carry a fair balance to the reserve fund.

The resolution adopting the accounts and balance-sheet, and the re-election of the retiring director and auditor were then unanimously carried, after which the following report was read:—

March 21.—I beg to hand you my annual report upon this mine:—Seaham's engine-shaft has been sunk to a depth of 3 fms. below the 105, and is now a total perpendicular depth from surface of 128 fms. 9 in. We have fixed the 7-in. drawing-lift, cistern, ladderway, and dividing between the pumping and winding portions of the shaft. The 105 fm. level cross-cut has been driven north 5½ fms.; the first 4 fms. were driven through the bastard lode, in which we had fac-s of lead through out; and upon the south side of it, in the eastern end of the shaft, we found it productive to the extent of 2 tons of lead ore per cubic fathom; I may here remark that as depth is attained this bastard lode becomes more favourable for the production of lead ore. At 4 fms. north of shaft we intersected the main lode, and have driven 9 ft. into it; we find that it maintains its strong and masterly character, producing so far saving work for dressing. We have not yet driven far enough north to cut the main leader, and even then we cannot expect to meet with much riches for the reason stated in my former reports—that the great runs of ore seen at the corresponding point in the levels above dip westward, and at the 90 we shall most likely have to drive some fathoms upon the course of the lode before we meet with the runs of ore ground already discovered at the bottom of the 90, east and west of the engine-shaft. The 90 has been extended west of shaft upon the main leader 39 fms., upon a lode varying in value (for the width carried) from 15*l.* to 100*l.* per cubic fathom, or an average of 50*l.* per cubic fathom. The same level has been extended east of shaft 22 fms. (also upon the main leader), varying in value from 15*l.* to 45*l.* per cubic fathom, or an average of 30*l.* per cubic fathom for width carried. A cross-cut has been driven north and south to prove the width of the lode at a point about 8 fms. west of shaft, where we find it to be 5 fms. wide, intermixed with lead throughout.

The 75 fm. level has been extended 40 fms. upon the main leader, and the end is now 77 fms. west of shaft. The value of the lode has varied from 40*l.* to 100*l.* per fathom for width carried, or an average of 75*l.* per cubic fathom. This piece of ground is all before us in the 90. Two winzes have been sunk below this level (to ventilate the 90) at points 8 fms. and 40 fms. west of shaft respectively. I may remind you that these winzes will also be available for transit of stuff to fill stopes in the back of 90 when required. The lode has been opened to full width to a point 60 fms. west of shaft, and has been valued at from 20*l.* to 120*l.*; but is worth, on an average for the 45 fms. opened this year, 40*l.* per cubic fathom—average width of lode, 16 to 17 feet. We are driving a level by the side of the lode, starting from the cross-cut 60 fms. west of shaft. This level is driven for the purpose of facilitating and expediting the opening out of the lode in this section of ground, by communicating with the 90 fm. winze sunk below the 60, thereby effecting ample ventilation, and also putting ourselves in position to prove the lode by cross-cuts in advance of the 75 (upon main leader), and drive westward upon its course.

The 75 east has been extended 18 fms., upon a lode worth on an average 30*l.* per cubic fathom for lead ore. At a point about 38 fms. west of shaft we crossed north 44 ft., and for 40 ft. wide the lode was intermixed throughout with lead. A winze has been sunk below this level to communicate with and ventilate the 90 east, when it reaches this point. The 60 has been extended 9 fms. by the side of the lode, now measuring 50 fms. When we have driven a few fathoms further we shall cross north to prove the value of the lode. A winze has been sunk at a point 41 fms. east of shaft to ventilate the 75. The 60 has been extended 50 fms., and now measures 144 fms. west of shaft. The first 20 fms. of this year's driving was upon a lode worth on an average 50*l.* per cubic fathom. We may expect a good course of ore in the 75 under this point, as the remaining 30 fms. have just skimmed the top of several good branches of ore. The present end is worth 50*l.* per cubic fathom for lead ore. It is a grand thing to see the ore ground lengthen so rapidly as we sink in depth. Two winzes have been sunk below this level at the 60 and 90 fms. west of shaft, for the purpose of ventilating the 75. The stopes in back of this level (15 in number) are worth on an average 27*l.* per cubic fathom; average width 16 ft. The 45, west of shaft, has been extended 20 fms., and the end is now nearly in a perpendicular line under Edwards' shaft. A rise has been put up at the present end to the 30, and several cross-cuts have been driven at intervals to prove the lode. We have on several occasions cut nice stones of lead in this driving, but nothing sufficient to value. The stopes in back of this level (now nine in number) are worth on an average 26*l.* per fathom; average width 17 ft. The only work doing at the 30 at present is the continuing of the rise from the end of the 45 to the 15.

The 15 fm. level: The stopes in the back of this level are all worked out, but we have continued one into the back of the adit, which is 9 ft. wide, and worth about 17*l.* per cubic fathom for lead ore.—Permanent Levels: Our permanent levels (chiefly the 45, east and west) have been extended 100 fms. We are now driving the 60 east towards East Van, and as soon as we commence stoping at the 90 we shall resume the driving of the 75 east, and no doubt we shall meet with great riches in the eastern part of our sett.—Surface: We have completed the alterations on the dressing floors, and I am glad to say that the results have exceeded our expectation. During the year we have had two new Galloway boilers, one for the winding-engine and the other for the Manchester engines, also a 70 in. Cornish pumping-engine and boilers. We have been very busily engaged of late in making preparations for the erection of this engine, cutting for foundations, clearing quarries, raising stones, &c. We have completed the new reservoir at the bottom of the floors. The reservoir when full covers about 12 acres. We have completed the erection of six new cottages, all of which have been let to be inhabited on April 1 next. We have also built a new smiths' shop, containing two forges. We have nearly completed the erection of a large storehouse. A large slime pit is in course of construction, for the purpose of filtering the water before it runs into the brook. Our machinery is all in good working order. In conclusion, I will simply say that the mine never looked better on the whole than at the present time, nor have the reserves ever been so enormous, and, as I have stated on former occasions in concluding my anual reports, the mine needs no puffing, but speaks for itself.—WM. WILLIAMS.

The reading of this afforded great satisfaction to the meeting, and after a lively discussion the meeting closed with a vote of thanks to the Chairman.

SAINT PATRICK LEAD MINING COMPANY.

A general meeting of shareholders was held at the London Tavern, on Thursday,—Mr. ALFRED THOMAS, in the chair.

Mr. G. S. CAUNTER (the secretary) read the notice convening the meeting.

The report of the agent (Capt. W. Francis) stated that having completed the engine-shaft to the 120 yard level, by separation into a drawing and ladder way, after a heavy outlay in timbering and securing the bottom cross-cut at this level has been driven on to a distance of 43½ yards north from the shaft, in the true-bearing carboniferous white limestone, of a firm and compact character; and I am induced to believe the first main vein that is intersected in these measures will prove rich and valuable. Several joints and feeders have been passed through in the upper (90 yards) cross-cut, but these are in the black fossiliferous limestone running in east and west direction; and the probability is that in the lower measures, in which the bottom cross-cut is being driven, they will form into one good-bearing main lode, and give immediate returns and profit. The first of these joints in the upper cross-cut is about 12 yards beyond, or to the north of the present forebreast, in the bottom cross cut; but as veins frequently exist in the white limestone which do not make their appearance in the black limestone at all, it is not improbable that a rich main vein may be intersected here before it reaches that point, and it may, in fact, be so at any time during the driving. The 90 yards cross-cut has been driven on the great Pant-y-Go cross-course from the shaft northward, and is now in 121 yards, having lately struck into a huge cavern, which has been the means of making the cross-cut good for fully 32 yards, after being properly propped and secured. This circumstance will enable the driving to be continued very cheaply and speedily, as the cavern will hold the deads for some months without having to draw to surface; but these advantages are far exceeded by the marked feature which it presents, as being most likely to be in the vicinity of a main vein and a large deposit of lead ore, as is the case without exception where such huge caverns are found in the locality, and I look forward very hopefully to quick results. Some feeders and joints have been passed through in driving this cross cut that are likely to lead to good deposits of lead ore in flats and pipes just under the chert measures by judicious trials hereafter, but at present he would earnestly advise all outlay and efforts to be concentrated in the two trials now going on. These joints on passing into the lower measures will most likely form into one main lode in the white limestone, as before alluded to, and will prove to be the first vein expected to be intersected in these latter measures. You have the chert measures wholly untried, and these will claim special notice as discoveries are made and the mine becomes further developed, a lodge being already cut for commencing a cross cut in them at 60 yards deep, at a point where the adjoining Halkyn and Maesylgan Mines proved so rich.

The CHAIRMAN said the accounts were sufficiently clear and detailed to need no further explanation, but he should be glad to reply to any question shareholders desired to put. He might mention the monthly cost was kept closely paid, and, with regard to the mine, the report of the agent had already placed before them its position and prospects. Scarcely was it necessary to state the board regretted they had as yet nothing tangible in point of positive results to submit to the shareholders. The indications were favourable, and any day success might be achieved. Within a fathom or two it was, of course, impossible to say when the lode would be cut, but the measures were congenial for the bearing of mineral. He visited the mine periodically, and accompanied Capt. Francis underground. He (the Chairman) could bear testimony to the correctness of the reports, and also to the miner-like and economical manner in which every detail was invariably conducted. The mine had great natural advantages, and not having any water, pumping machinery was unnecessary; while the large natural cavities saved the cost of drawing the waste from the cross-cuts. Capt. Francis, the manager, was present to afford additional information. He concluded by moving the reception and adoption of the accounts.

Mr. LYNCH seconded the proposition, which was put and carried unanimously.

Capt. FRANCIS explained the various points of operation.

A vote of thanks to the Chairman and directors closed the proceedings.

WHEAL GRENVILLE MINING COMPANY.

The three-monthly general meeting of shareholders was held at the office, St. Andrew House, Cornhill, on Thursday, to pass the accounts, to make a call, to elect a member of the committee of management, in the room of the Rev. J. B. Fenwick, disqualified, and to transact the ordinary business of the company.

Mr. R. W. GOOLD in the chair.

Mr. T. B. LAWS (the secretary) read the notice convening the meeting, and the minutes of the last general and special meeting.

The statement of expenditure and receipts showed a credit balance of 54*l.* 15*s.* The liabilities and assets (up to May) showed an estimated debit balance of 2887*l.*

The CHAIRMAN said, on entering office the committee prepared and submitted a formal report, but did not propose to do so in future, inasmuch as the minutes of the proceedings of each committee meeting were duly recorded, and open to the inspection of shareholders; moreover, it was proposed to read them at this meeting. He should be very glad if more shareholders would join the committee, especially any residing in town.

The SECRETARY then read the minutes of the various committee meetings held since the last general meeting of shareholders. One was to the effect that Mr. John Watson, the late secretary, had written to the committee requesting them to remove the remaining books of the company.

Mr. LAWS explained that he intended to do so as soon as he could make room for them.

The CHAIRMAN, referring to that minute, said that at the date of the last meeting the present committee had been in office only a very short time, and it was suggested that steps should be taken to compel Mr. Watson to give up the books of the company. He (the Chairman) suggested at the time the matter should be allowed to stand over for a short period, to allow the feeling then existing to tone down, having no doubt that Mr. Watson would be perfectly prepared to hand over the books upon a proper application. He understood at that time there had been a disinclination on the part of Mr. Watson to hand over the books, but had since been very pleased to find that no such disinclination had been manifested. He was quite prepared to give every justice to Mr. Watson, and very sorry if he had made a statement in any way offensive. Mr. Watson had written him a letter saying that injustice had been done him in stating that he had refused to hand over the books; he (the Chairman) had never stated such a thing, but, notwithstanding that, in justice to Mr. Watson, he now withdrew any allusion to the matter that might have been inadvertently made.

Mr. SCHOFIELD said there was no doubt Mr. Watson had displayed great reluctance in giving up the books, but had not positively refused.

Mr. DOWLING said that was the impression conveyed to his mind when at his office.

The SECRETARY understood from Mr. Watson that there were ten tin boxes containing documents belonging to the company, and the only reason they had not been sent for was that he had not room for them.

The CHAIRMAN said he did not propose to make any observations with regard to the actual working of the mine. As a friend out of doors had said the committee were not miners, that was perfectly true; they did not profess to be, their only duty was to supervise the accounts to the best of their ability for the proper development of the mine; they had to look to superior scientific knowledge outside of themselves. He would not offend their common sense by making any observation with reference to what outsiders chose to say about the committee, although there had been made some most offensive remarks. As he had already said, the committee would only be too glad if other shareholders would join them, but so long as the present members had the confidence of their co-shareholders so long would they do their utmost to promote their best interests. As to the present financial position of the company, it would be remembered that at the last meeting they were in debt 552*l.*, but the position now is this—including the cost-sheet about to be paid the total liability is 3600*l.*, so that they were nearly 2000*l.* better off than at the last meeting; then the balance at the bank was 37*l.*, whereas it is now 545*l.* Of course that had been done by the assistance the shareholders had rendered the committee, but he ventured to think there was not another mine in Cornwall that had, during the last three months, reduced its liabilities by nearly 2000*l.* (Hear, hear.) With regard to the expenditure and receipts, he should state that the present committee and manager did not have any actual control until February. For two or three months up to that period the expenses had been increasing at a rather alarming rate, and the last cost-sheet of the late management amounted to 1040*l.* When Capt. Hodge came into office he exercised a very wise judgment by considerably reducing the expenditure; this had been done, too, not at the expense of the proper development of the mine. Shareholders should not be mislead by the mistatements put forward from time to time by irresponsible parties who had an interest to serve other than the success of the mine. In February, when the cost had been 1040*l.*, there were employed 125 men, the monthly cost was now 910*l.* with the same number of men and an equal amount of work done. If these facts told against Capt. Hosking so much the worse. He did not wish to reflect upon him, nor would he withold the statement, however much it told against the late committee. He believed the expenditure would be further reduced without affecting the proper development of the mine. The committee hesitated to make any promise on this matter, but he believed results would prove the correctness of his opinion.

Mr. GUITERRIEZ drew attention to the item of sundry charges, which in January was 45*l.*, and in February only 14*l.*

The CHAIRMAN explained that in January there were two sets of officers employed, and the late agents could not be dismissed at a minute's notice.

Mr. F. G. LANE said the item had been further increased by including the rates and income tax.

The CHAIRMAN said the January account would be necessarily somewhat increased by the change of management. With regard to the sales of ore, he found that in August the amount realised had been 752*l.*, and that it had gradually decreased until in January it amounted to only 487*l.* He did not mean to say that Captain Hosking was to be blamed, but there was before them this big and significant fact: that in the next month, when Captain Hodge assumed the management, the sale of ore had realised 535*l.*; and if he did not mistake, that for the present month would show a still further increase, notwithstanding that in the meantime there had been another drop in the price of tin. In the face of that fact, he did say it was a most unmanly, ungentlemanly, not to say unprincipled, act for any one to turn round and condemn Captain Hodge. (Hear, hear.)

Mr. SCHOFIELD: Is there such a person as Mr. F. L. A. T. Rodda?

The CHAIRMAN: Yes, we know him, he is not so far away from us, as he would wish us to suppose.

Mr. N. F. WATSON: Has the ore been raised from underground by the present manager?

The CHAIRMAN: Yes, and that the quantity can be increased is a fact that cannot be controverted. It has been increased, and still may be increased, even by the present stamping power. At the pre-

ent moment the stamping power is not in good order, and unless there was an appreciable rise in the price of tin no very considerable increase in the monthly sale can be looked for. Looking at the downward course of our affairs when we took office, it is satisfactory we have not gone down further but turned the corner, and we hope we shall go on from better to better. There is the cloud of the price of tin, which at the present moment appears to be lower than at any former period, and the question before us is can it go lower, is it going to remain where it is, or is it going to improve? According to the best authorities, we may hope it is going to be better, in which case we shall very materially be benefited. There are hundreds of fathoms of ground opened up in Wheal Grenville, there are thousands or tens of thousands of tons of ore which can be brought away at a profit if the price of tin advanced only a very little, and perhaps larger quantities if a still greater advance took place. If I were disposed to be a caviller I might ask why the late management allowed these enormous reserves to remain in the mine with its financial position getting from bad to worse, and I might ask what was the motive inducing that management to allow all these reserves to remain rather than take them away, when only six months since they could have been sold at a good profit? Why, I might ask, was not this done rather than allow the liabilities to accumulate up to 5000*l.*? If tin should go up again—if only to a small extent—and stand at the same price it was in October last year, receipts would be increased by 40 or 50 per cent. even by the present machinery. I am convinced of that as the result of a consultation with some of the best miners in Cornwall. I for one will set my face entirely against any proposition that may be made to incur expense for additional machinery until we are quite out of debt. I will now move that the statement of expenditure and receipts and liabilities and assets be received and passed.

Mr. KINNEAR seconded the proposition.

The CHAIRMAN announced that he had just received a telegram that the sale of ore this month had realised 579*l.*, although only at 43*l.* 10s. per ton, or a further fall of nearly 2*l.* 5s. per ton.

Mr. N. F. WATSON: Was that ore raised from underground?

The CHAIRMAN: Yes, it was. Does such a question imply that it was bought?

Mr. SCHOFIELD: Do you suppose it was stolen?

The CHAIRMAN: Where do you, Mr. Watson, suppose we got it from.——Mr. N. F. WATSON: That is for you to find out.

Mr. SCHOFIELD: It is gratifying to see that our returns are increasing, and that in face of lower prices we are now realising nearly as good an average per ton as in December last, showing some improvement in the dressing of the tin.

Mr. DOWLING: As there appears to be some doubt as to where the tin came from, perhaps Mr. Watson may give us some information upon the subject?——The CHAIRMAN: We know where all the spitting comes from, but it is a pity that Mr. Watson comes here and rather lowers himself by such a question.

Mr. WATSON: I merely asked a question.

The CHAIRMAN: Which I have replied to by asking you another, to which you have not replied.

Mr. W. WARD: Does Mr. Watson think the tin was carted from Dolcoath? (Laughter).——The CHAIRMAN: We have some 10 tons of copper ore to be sold before the next meeting—that is really an asset, whatever it may fetch.

Mr. WARD: As Mr. Watson has asked where the tin came from, I may ask him whether the merchants' bills for 1875 came from? (Laughter.)——The CHAIRMAN: That question is quite as reasonable as the other.

Mr. SCHOFIELD: It is quite clear the merchants' bills did not come from underground.——The CHAIRMAN: It is equally clear we have to pay them.

Mr. WARD: The accounts clearly show that had it not been for these merchants' bills the mine would now be in a very healthy financial condition. (Hear, hear.)

The CHAIRMAN, in reply to a question, said that there were at present 48 heads of stamps.

Mr. GUITERREZ urged that the stamping power should be further increased.

The CHAIRMAN said that according to the opinion of a captain of great experience the present available reserves in the mine could not be worked out in less than five years.

Mr. SCHOFIELD had no doubt with such a lode as that reported on by the manager profits could be realised whatever the price of tin.

Mr. F. G. LANE mentioned that upon the great lode there had been laid open last quarter 170 fms. of reserve ore ground more than previously. As to the proposal to increase the stamping power, he suggested the desirability of waiting until the company was entirely out of debt.

The CHAIRMAN, in reply to a question, stated that the dues had been reduced from 1 24th to 1-30th, equal to about 20 per cent. on the lord's receipts.

The accounts were unanimously passed and allowed.

Mr. SCHOFIELD proposed a call of 10s. per share, which would nearly clear off the debt.——Mr. KINNEAR seconded the proposition.

Mr. WARD said that would provide for the loss incurred during the next three months. According to the Cornish method of making up accounts, which were generally two months in arrear, a call would be unnecessary upon the present occasion. Instead of being two months in arrear with the costs they were two months in advance. He did not wish it to be understood that he took exception to this course, but thought the shareholders should be acquainted with the fact that by the call now proposed the mine would occupy a financial position second to none in Cornwall. (Hear, hear.)

Mr. N. F. WATSON enquired if the mine was in fork?——The CHAIRMAN said a telegram had been received that the pin had been broken of the engine bob, and the water had risen to the 150, but the manager hoped to repair the damage during the next day.

Mr. WATSON enquired if there had been any increase of water before the accident?——The CHAIRMAN said that Mr. Hodge had referred to it in his last report.

Mr. LANE had been assured that the stoppage of East Grenville would not, as regards the water, affect Grenville.

The resolution making a call of 10s. per share was put and carried unanimously.

The CHAIRMAN said he joined the mine a total stranger to any one connected with it. He knew nothing of the Messrs. Watson, and only voted for Mr. Lane's resolution because he saw he had a large number of proxies from old shareholders, and was supported by the majority of the shareholders at the meeting. For those reasons he decided to act with Mr. Lane, and he could not allow the shareholders to separate to-day without bearing his testimony in the most candid way to the earnest and indefatigable manner in which Mr. Lane had used his every effort to promote the welfare of Wheal Grenville. (Hear, hear.) Mr. Lane was not influenced by selfish motives, but by a desire that the mine should be worked to the best possible advantage for the shareholders; no one could devote a greater amount of attention nor more time to ensure the desirable end he had in view. (Hear, hear.) He had much pleasure in proposing that the best thanks of the company were due and hereby tendered to Mr. F. G. Lane for the great interest he had taken in promoting the welfare of Wheal Grenville.

Mr. DOWLING had much pleasure in seconding the proposition. Mr. Lane, as a straightforward and business-like man, had attacked that which he considered wrong in the management, and worked zealously and fearlessly to uproot it and establish a system by which the shareholders should realise some benefit from their outlay.

The resolution was put and carried unanimously.

Mr. F. G. LANE said he was extremely obliged for this renewed mark of the shareholders' confidence. If his efforts were appreciated by his co-proprietors he regarded that alone as a sufficient recompense for the trouble and anxiety which had been inseparable from the work he had taken in hand. Apart from this, however, his friends and himself held a large interest in the mine, and so long as he retained the confidence of the shareholders so long would he do his very utmost for the interest of all concerned. The success of the mine was his only desire, and no exertion on his part would be spared to ensure it. (Hear, hear.)

Mr. Goodwin was added to the committee.

Mr. SCHOFIELD moved that the thanks of the shareholders be awarded to the committee, who had done so much and so successfully in placing the mine upon a sound footing, and its finances in a healthy condition.

The resolution was seconded and carried unanimously.

The CHAIRMAN said the committee had done the best they could in the past, and would continue to do so in the future.—The meeting then separated.

WHEAL CUNNING.

Wheal Cunning account gives us another cheering bit of news from the parish of St. Just, and another proof of the energy and perseverance of her mine managers. Capt. Boyns, of Boswedden, and his co-adventurers were driven back by years of non-success from the favourite and long-cherished scheme of finding abundant stores of mineral wealth in the junction of the killas and granite under the sea off Boswedden and Wheal Castle. But they were not defeated. So they changed front, and attacked the shallower ground inland known as Wheal Cunning. To this set was joined portions of Boscean. At first there was success; then, and most provokingly, for tin was at a much higher figure than now, the mineral could not be "won" to the desired extent; yet now, amidst the general gloom, Wheal Cunning and its financial affairs look so bright that the shareholders have resolved to let their balance of 1160*l.* due to the Mount's Bay Bank stand against them, in hopes that, even with tin at 40*l.* a ton, they may not increase that balance.

The 16 weeks' accounts show an expenditure of 1158*l.*—*i.e.*, on labour and carriage, 1012*l.*; materials, 67*l.*; coals, 71*l.*; and sundries, 8*l.*: 25 tons of tin sold for 960*l.*, from which one-half dues, a clear fiftieth part, or 22*l.*, have to be deducted: and materials sold, liabilities on relinquished shares, and stamping tinstuff yield 297*l.*—133*l.*, and there is a balance of profit of 181*l.* In July the balance against the mine was 125*l.* Calls and the present profit reduce this to 385*l.*

Capts. James Roach and William Hattam say:—In the adit east, on Wheal Cunning lode, about 4 fms. of good tribute ground have been opened since last account. The end is not looking so well at present. We have not cut the lode further in the cross-cut adit east White Weeth, or south Wheal Cunning. In the west most of the ground opened during the 16 weeks will work on tribute. In the 25 west the lode is small and poor.

The manager, Capt. Boyns, writes:—I am glad that the balance-sheet of to-day is more favourable than I anticipated, notwithstanding the fearful drops in the price of tin, for we were paid only 42*l.* 5s. per ton for our last parcel. These ruinous prices, however, cannot last very long. I regret that the improvement we met with in the adit east since last account has fallen off in value. Had it continued, that one point alone would have put the mine in a safe position. It is generally believed we have a promising piece of ground ahead of us. I am also very hopeful that in extending the 65 and 75 west we shall open up paying tin ground. In the cross-cut north adit east White Weeth we have cut another vein. In the south cross-cut we expected to have cut Wheal Bozand's lode ere this. Both of these cross-cuts must be extended further. In the latter, we cannot be far from the Red Weeth lode.

RHEIDOL LEAD MINING COMPANY.—The annual meeting of shareholders was held, on Monday, at the offices of the company, Cannon-street, under the presidency of Mr. C. Wells Owen. The report of the directors was taken as read.—The Chairman said that the operations of the company during the past year had been mainly directed to the underground works in the Altddhu lode. The latest advices from the agent recommend that they should stope in the back of the 10, east and west of the shaft, which would add considerably to the pile of stuff at the surface. The blende in back of the adit improved very much after they commenced working, and would leave a profit on working. There were 60 or 70 fms. of whole ground over that point, and if the ore improved and lengthened in going up, as in other runs, there would be a great quantity of lead and blende to come therefrom. In conclusion, he moved the adoption of the report.—Mr. Threw Jegon seconded the motion, which was carried. The retiring directors—Major A. B. Brown and Mr. H. Prowse, jun.—were re-elected. The meeting was then made special, and the following resolution—"That the capital of the company be increased by the creation of 12,500 new shares of 1*l.* each, with priority as regards dividends over the 800 of the 5*l.* shares of the existing capital denominated deferred shares until such dividends shall have amounted in the aggregate to 50 per cent. of the amount for the time being paid up on such new shares and on the ordinary shares, and thereafter ranking for dividends with the shares of the existing capital, in proportion to the amount for the time being paid up on such new and existing shares respectively"—having been sanctioned, the proceedings terminated with a vote of thanks to the Chairman and directors.

WEST WHEAL LUCY.—At the special general meeting, on Thursday, the resolutions passed at the previous meeting for the winding-up of the company were confirmed.

SOUTH WALES SMELTING AND COLLIERY COMPANY.—At a general meeting of shareholders, held at the smelting works, Penclawdd, on Monday, March 13 (Mr. Henry L. Phillips, F.G.S., in the chair), the report of the directors, and the audited balance-sheet of the company to Dec. 31, were received and adopted. A dividend of 5s. per share was declared. Dr. T. L. Phipson was re-elected a director of the company, and Messrs. Theobald Brothers and Miall the auditors for the ensuing year.

ST. AGNES CONSOLS.—An extraordinary general meeting of shareholders in this company was held on the mine on the 18th inst.—Mr. John B. Reynolds in the chair. In consequence of the whole of the capital having been expended, and the general disinclination on the part of the shareholders to subscribe further for the prosecution of the works under the present company, it was unanimously decided to go into voluntary liquidation. As a matter of course, there is no intention on the part of the large body of proprietors to abandon the undertaking, and we understand that if the property is put up to public auction it will be purchased by those shareholders who are subscribing for that purpose. The large majority of shares in the company represented at the meeting is an indication of the interest the proprietors are taking in their business. It is a matter for surprise that the shareholders in this mine should for a moment have hesitated to contribute further to the old capital, but it is assumed that the unexpected state of the tin market has quite frustrated the efforts in that direction.

JAVALI COMPANY (LIMITED).

The following report will be presented by the directors to the shareholders at the meeting on Friday next:—

The directors have much pleasure in presenting to the shareholders a statement of accounts, which, for the first time since the company's formation, shows a profit upon the year's working, in addition to interest on debentures. At the last annual meeting the board announced to the shareholders their belief that the only policy which could lead to eventual success was that of perfecting and increasing the machinery at the mine, with a view to obtaining larger gross returns; and it will be seen from the accounts that 1805*l.* 17s. 11d. has been spent during the year in this direction.

Capt. Sohns has now at his command, and in perfect working order, 30 stamps and an excellent steam-engine, and unless the quality of the ore should permanently fall off, the board see no reason why his repeatedly expressed conviction—that a gross annual return of upwards of 20,000*l.* could with these appliances be realised—should not be verified during the coming year.

Since the last meeting of shareholders further samples of tailings have been received, the last of which, stated by Capt. Sohns to be collected after the ore had passed through the whole of the reduction process, showed an assay value of 13 dwts. of gold and 6 ozs. of silver to the ton; and the board have thought it right to sanction the erection of a tailing mill, which will be ready by the next wet season, and cost 600*l.*; this, and the laying of a tramway towards the forest, at the cost of 400*l.*, to cheapen the supply of fuel for the steam engine, and (should the profit justify it) a complete set of assaying plant, are the only items of expenditure on capital account which are at present in contemplation.

The financial scheme proposed by the board in their circular of Jan. 29 has met with very general approval. In the resolution which will be proposed on this subject, the scheme will be so far modified as to provide for the paying off at least 2000*l.* of debentures in each year before paying anything to the other classes. The heavy expenditure on capital account during the last year, as also the adoption of a system of supplying the financial wants of Capt. Sohns in coin sent direct from England, instead of by bills drawn in Chontales, has exhausted the ready money at the company's command. This want has been partially supplied by a subscription amongst the larger shareholders, but the board may find it necessary eventually to apply to the general body. The following comparative statement, showing real and substantial progress, will be satisfactory to the shareholders:—

Year.	Ore crushed.	Value of gold realised.	Expenses, exclusive of machinery, &c.
1873	Tons 8,850	£ 7,483	£ 7,566
1874	10,967	10,404	9,281
1875	14,550	13,253	10,864

HENDREFORGAN COLLIERY COMPANY.

The following report will be presented by the directors to the shareholders at the meeting on Tuesday:—

In presenting their report for the past year your directors feel that there is ample ground for satisfaction with the results obtained: when it is remembered that this colliery (participating in the great strike that prevailed throughout South Wales during so large a portion of the year) was only in work from five to six months. It is, therefore, unquestionable that great advantages are possessed by the Hendreforgan Colliery, otherwise similar heavy losses to those sustained by Welsh collieries generally must have attended the operations of the year. The cessation of work was, moreover, prejudicial from its occurrence at a period of the year when the contracts for the sale of anthracite coal are usually made, so that in addition to the expense occasioned by the maintenance of the works during a period of inaction, the sales for the whole year were most seriously affected. The operations for winning the Big Vein were, however, satisfactorily completed through the importation of Cornish labour. This seam was reached at the anticipated distance, and has proved to be of the finest possible quality. Means have also been taken to further develope the workings in the Brass or Diamond vein, and they are now in the most satisfactory position.

The coal from both seams has met with the entire approval of the purchasers, and, notwithstanding the extremely depressed state of the coal trade, the operations of the colliery can be carried on with fair returns to the shareholders; with that improvement in trade which (following all precedent) must ere long occur, and the provision of an additional small amount of capital needed, the results cannot fail to be of a highly remunerative nature. This is not conjectural, but is founded upon the experience of the past twelve months and the satisfactory position of the colliery. Additional capital is needed for the payment of 3400*l.* on account of balance due for the purchase of the colliery, the formation of a second opening on the "Big Vein" (required in conformity with the provisions of the Mines Regulation Act), the extension of siding accommodation, and for working capital required for the increasing trade of the colliery. For these several purposes it is desirable to place 500 shares. On a sale of even 150 to 200 tons of coal per day very good returns will result. At present prices, an average profit of 2s. per ton is expected, but a profit of only 1s. 6d. per ton will give 10 per cent. dividends to the shareholders. A portion of these shares will be taken by the vendors, and your directors urge the shareholders to at once take up the remainder.

Upon sufficient shares being taken they are prepared to recommend that the profits already earned be divided amongst the shareholders at the rate of 7½ per per cent. per annum on the subscribed capital; it is manifestly, therefore, to the interest of each shareholder to take up a portion. Your directors are glad to find that a new demand for anthracite coal has commenced for the manufacture of coke, and they are already supplying 40 tons per day for this purpose, the coke produced (now consumed at the Landore Steel works, near Swansea) is of the most superior quality, and there appears every prospect of its ere long being so extensively used as to materially enhance the value of anthracite collieries.

The directors, in concluding their report, would direct the attention of the shareholders to the small sum (amounting only to 292*l.* 4s. 8d.) charged to the company for the expenses of formation, 115*l.* 13s. 2d. of which is for the necessary stamps on deeds and law charges; they also desire to state that Mr. Bain (from whom the colliery was purchased) still continues to afford gratuitously his whole time in its management; and further, that through the arrangement with Mr. C. H. Perkins for the sale of the coal, they secured a formed connection, a matter of the utmost importance to the success of an anthracite colliery. It is with great satisfaction your directors dwell upon these circumstances, and upon the fact (thus proved) that, even under very adverse circumstances, this colliery, honestly and legitimately entered into, and properly carried out, is successful and profitable to the shareholders.

[For remainder of Meetings see to-day's Journal.]

SILBER WIND LAMPS.—Another invention has been patented by Mr. A. M. SILBER, of Wood-street, which relates more particularly to lamps exposed to gusts of wind. According to one construction a metal ring having a large annular opening for admission of air, supports a glass of basin form, and within it a perforated metal casing open at bottom. Within this casing is the oil reservoir, which is kept cool by the air entering the bottom of the casing. The wick which projects from the oil reservoir has over it a a deflecting cone, carried by the casing and carrying the chimney glass. Outside the chimney glass is an external glass, which rests on the lower glass basin before mentioned, air being made to pass up between the chimney and external glass, to keep the former cool. The external glass is surmounted by a perforated crown having a conical shell projecting inwards and over it an inverted cone, leaving a passage between them for the escape of the products of combustion. According to another construction for signalling or ship lamps, a lantern having having two flat sides at an angle and a curved side with a lens has within one of the flat sides a chamber, within which is an air tube open to the atmosphere at bottom. The air passes by a side opening into a perforated casing enclosing the oil reservoir like that previously described, with deflecting cone over the wick mounted on the casing. At some distance above the flame is a chimney without any intervening glass, a passage being formed round the chimney for the escape of heated air from the lamp to the crown, which consists of an outer casing within which is an annular trough, into which dips a perforated cap covering the chimney. At the bottom of the trough and of the casing are holes for the escape of water. For Argand burners the wick is made more durable by arranging the metal walls so as not to touch its upper part, the lower part of the wick being stretched on a collar in the lower part of the inner tube.

MINING IN SOUTH AUSTRALIA.

THE KURILLA.—The general prospects of this mine are remarkably good. On the old lode the 35 and 25 levels going east are opening good ore ground, and a winze sinking from the 15 to the 25 will, in a few days, render the back of the 25 available for tribute works. The new hauling shaft is complete to the 25 fm. level, and the new whim, with its apparently flimsy steel wire-rope, is set to draw from that level. Judging from appearances, we should not think the rope—120 fms. of which weighed less than 4 cwts.—of sufficient strength to suspend so heavy a load, but Capt. Anthony assured us that it calculated to suspend over 6 tons. So light is it that a large kibble of stuff is an easy load for one horse. During the month from 40 to 50 tons of ore, averaging about 18 per cent., have been sold to the English and Australian Copper Campany, and samples have been taken of about 50 to 60 tons of still richer ore for the month of December. A considerable quantity is again accumulating—some yellow bell metal ore from the 35 level at Hall shaft being very rich, as is a pile of green ore from Morphett's lode. We note that some excellent building stone is being raised a few yards north of Morphett's lode, and roughly dressed for the new engine house, and that there are very distinct and decided stains of green copper ore running through it, associated with soft brown manganese, which lines the vent-holes about which the copper occurs. Captain Anthony tells us that the occurrences is the same as in the back of the lode at the Blinman, in the Far North, in a calcaria silicious rock, but less in quantity. No doubt can exist of another lode yet undiscovered, except as indicated by those surface stains, lying still further north, and adding value to the Devon Consols as well as to this already valuable property. Locally, it is thought a great pity that the experiences of English companies in colonial mining—rendering them overcautious in the use of their money—should be allowed to straighten the operations of this very good young mine. No reasonable outlay in suitable machinery should be spared at this juncture, and the utmost vigour should characterise all exploratory operations. Mining, like all other undertakings, is expensive at the outset, and should be fostered with every possible care.

DEVON CONSOLS.—At Hosking's shaft the lode is still in the south side. I shall not attempt to cut through it until this shaft is down to the 45. In the bottom of the 35 we have a splendid lode 5 ft. wide, 3 ft. of which is solid ore, and the remaining 2 ft. is ore and spar. From present appearance there is no room for doubt as to the genuineness of the lode at the 45. Harris's shaft is the same as my last report.—Gurner's: The pitches are cut for the frame set, and a part of it is in. This will be completed next week, when sinking will be resumed. Driving west on the north part of the lode at the 20 (Gurner's), the lode is improving, good patches of ore having been met with during the week. The cross cut south is much the same as it has been, strings of ore all running through it. I shall continue driving this cross cut a little further to prove the ground south. I have sampled the tributers' ore, and shall make ready as early as possible for sale samples.—*Wallaroo Times*, Jan. 26.

TIN IN AUSTRALIA.—A company, called the Victoria Stream Tin Company (Limited), has been floated in London, to work the tin mines on the Latrobe river, South Gipps Land. These mines are situated about 30 miles from Cannibal Creek, on the Gipps Land coach road, and are about 70 miles from Melbourne. The land claimed by the company comprises about 700 acres, held under leases obtained from the mining department by Mr J. Woods, M.L.A., and Mr. L. L. Smith. The prospectus states that the capital of the company is 100,000*l.*, in 20,000 shares of 5*l.* each; 5000 shares remain for subscription. The London shareholders sent out Capt. W. Eddy, who claims to have had experience in tin mining in California and elsewhere, to report upon the mines. After spending six weeks on the ground, he reported that he found stream tin deposits varying in depth from 6 to 30 ft. from surface, and from 6 in. to 3 ft. thick all over the flat, embracing an area of from 500 to 1000 ft. in width through the valley. The average assay of the tin raised was 65 per cent. He believed the lease contained continuous and large payable deposits of stream tin, and that from the deepest part of the flat sufficient gold would be found to pay working expenses. An expenditure of about 6000*l.* will be required to obtain an uninterrupted supply of stream tin. Mr. Eddy left Melbourne yesterday with a party of men to commence operations.—*Melbourne Argus*, Jan. 14.

FOREIGN MINING AND METALLURGY.

A revival is still spoken of in the French iron trade, but it can scarcely be regarded as serious. At the same time there can be no doubt that a temporary activity prevails in some works. It is difficult, indeed, to deprive the works of the Ardennes, the Vosges, and the Franche-Comté district of the supremacy which they enjoy in regard to certain specialities. Nothing for a long time to come will replace charcoal-made iron for certain purposes; and, whatever changes metallurgical industry may undergo, small merchants' iron will always be required. With rails, girders, plates, and iron for machinery the case appears, however, very different, as iron is giving place to steel. Meanwhile, prices are tolerably firmly maintained, and the margin between qualities is maintained at its usual rate. At Paris, first-class merchants' is dealt in currently at 8*l.* per ton. Upon the whole, the state of the French iron trade is still considered to be indifferent. An announcement is made of the contemplated sale of the Naix-aux-Forges Blast-Furnace, in the Meuse; this furnace is situated on the line in working from Nançois-le-Petit to Gondrecourt, on a line decreed and conceded from Lerouville to Eurville, and on the canal from the Marne to the Rhine. Attached to the furnace is a rich concession of minerals in the Meurthe-et-Moselle. Several of the ironworks in the Nord have sustained considerable injury, in consequence of a severe storm which visited that district a few days since.

Coal prices appear to be steadily declining on the Continent. A correspondent, writing to a Vienna paper, describes the depression in the important German district of Upper Silesia as extreme. Consumption has greatly fallen off, and this has induced a hurried course of underselling on the part of coal proprietors which has never before been paralleled. The output has been reduced, but this has not given firmness to prices, owing to the action of the two important joint-stock companies which carry on the Konigs and Laura Works in further reducing their prices. The correspondent complains that the rates now asked scarcely cover the cost of forwarding.

Business in copper has remained in much the same state at Paris, and prices have not sensibly varied. There has been an absence of business in Chilian copper at Havre; first marks in bars have made from 81*l.* to 82*l.* per ton, and good current marks 80*l.* to 81*l.* per ton. At Marseilles red Toka has made 80*l.* per ton, and refined in small ingots 84*l.* per ton. Business in copper has been very quiet in Germany, and prices have ruled feeble. There has been no sensible change in tin quotations at Paris. At Marseilles Straits has brought 80*l.* and Billiton 78*l.* per ton. In consequence of the more encouraging advices received from London, tin has rather hardened in price at Rotterdam. Nevertheless, transactions have been inconsiderable, many holders having temporarily withdrawn from the market. There are purchasers of Billiton at 45½ fl., but there are no sellers below 46 fl. to 46½ fl. Banca has remained quoted nominally at 49 fl. In Germany transactions in tin have been unimportant. Lead quotations have been rather feebly sustained at Paris: in Germany prices have, however, been maintained pretty well. There has been scarcely any business doing in zinc at Paris. At Marseilles former quotations have not varied; Vieille Montague in sheets has made 32*l.* per ton. In Germany zinc quotations have been pretty well maintained.

The state of the Belgian metallurgical and mechanical trades is considered to be improving. The construction workshops are regaining something of their old animation from day to day, and the rolling mills are receiving orders for girders and tramway rails. The Marchienne-au-Pont Rolling Mills Company has, for instance, received an order for 2000 tons of girders and 1000 tons of tramway rails. There are, then, some hope of a serious revival in affairs, especially if Belgian industrials apply themselves resolutely to the task of seeking out important orders abroad. A railway and new port are about to be carried out at Batavia, in the island of Java; the attention of Belgian firms is being directed to this affair. An adjudication for 160 locomotive wheels with steel tyres and 380 axles is about to take place for the Berg and Mark Railway. The Val Bénoit Rolling Mill, which has been purchased by some Charleroi industrials, is about to instal a *tréfilerie* as an *annexe*.

There is not much to report with respect to the French coal trade. The winter appears to be finished, and the trade has entered upon the period of quiet which commences every year with the spring. There are reports of a probable revival in French metallurgical industry, and some ironworks are undoubtedly doing more for a time, as they are profiting from the enforced idleness of almost all hydraulic motors. At the same time, it would not do for French coal-owners to place too much reliance upon an improvement in French metallurgical affairs. There has been no advance in the Pas-de-Calais; but, on the contrary, a slight fall is taking place in quotations. In the case of large transactions this fall is even of some little

importance. At St. Etienne no change worth mentioning has occurred in the coal trade. At Paris, also, the coal trade has been very quiet, although industrial descriptions have continued in tolerably regular demand. In consequence of considerable floods navigation on canals has been practically suspended in many parts of France.

Recent adjudications for coal in Belgium have provoked a good deal of competition on the part of Belgian firms. The Marcinelle and Couillet Company tendered for one lot at 12s. per ton. As regards coke the Marcinelle and Couillet Company submitted the lowest tender—16s. 10d. per ton. Apart from these adjudications there is little intelligence to communicate with reference to the Belgian coal mining districts. The deliveries have been reduced by floods, and the enforced stoppage of some great works situated near rivers and canals. The winter season must be said to be ending badly for the Belgian coal trade, but the revival which is said to be taking place in metallurgical industry may soon cause all this to be forgotten. During January Belgium imported 69,000 tons of coal, against 56,000 tons in January, 1875, and 39,000 tons in January, 1874. The imports of coke into Belgium increased in January to 1800 tons, against 1600 tons in January, 1875, and 400 tons in January, 1874. The exports of coal from Belgium in January were 331,000 tons, against 319,000 tons in January, 1875, and 218,000 tons in January, 1874. The exports of coke from Belgium in January amounted to 42,000 tons, against 42,000 tons in January, 1875, and 40,000 tons in January, 1874.

FOREIGN MINES.

ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received March 2, 1876, ex Guadiana, dated Morro Velho, Feb. 1:—

GOLD EXTRACTED TO DATE.—The produce for the second division of January, a period of 10 days, amounts to 17,405·8 oits., and has been derived as follows:—

	Oits.	Tons.	Oits. per ton.
From general mineral	15,792·5 from	1883 =	8·386
Killas	388·5 ,,	194 =	1·744
Re-treatment	1,274·8 ,,	— =	·613
Total	17,405·8 ,,	2·77 =	8·380

Equal to..... 2006·6024 ozs. troy = ·9641 oz. per ton.

During this division of the month the stamps worked at the rate of 23·16 hours per diem, and being fully supplied with water during the greater part of it they were driven at a good speed, and very good duty was obtained.

A considerable quantity of poor stone is still being stamped and treated along with the general mineral, in addition to the amount returned as being reduced separately, and this is the cause of the average yield of the mineral continuing at a low standard.

The general health of the establishment is very good.

Advices received March 20, ex Douro, dated Morro Velho, Feb. 17:—

GENERAL OPERATIONS.—Since I had the honour of addressing you on Feb. 1, no interruptions of any consequence have occurred in the mine or reduction departments; in the former, having had a steady attendance of native borers, good duty has been done, but in the latter the stamping mills were driven at a slow rate of speed, owing to the water supply falling off in the first division of the month

MINE DEPARTMENT.—The work in this department has been carried on this month under more favourable circumstances than in the same period of January, and therefore very much better duty has been obtained in the sinking, stoping, and quarrying operations.

The mineral obtained from the various parts of the mine, and sent to the spalling floors for reduction has also undergone a considerable improvement in quality. Some killas is being derived in cleaning down the north wall from the western section and some quartzose mineral from the eastern section of the excavation, but I am in hopes, notwithstanding that the average yield of the general mineral for the current division will bear favourable comparison with that of late divisions.

PRODUCE FOR THE MONTH OF JANUARY.—The gold extracted during the month of January has amounted to 52,750·8 oits., or equal to 6081·3062 ozs. troy, and has been derived as follows:—

	Oits.	Tons.	Oits. per ton.
From mineral stamped	47,552·5 from	5362 =	8·870
Killas	1492·8 ,,	665 =	2·109
Total	48,955·3 ,,	6027 =	8·122
Re-treatment	3,795·5 ,,	— =	·629
Total	52,750·8 ,,	6027 =	8·751

Equal to 6081·3062 oz. troy = 1·0880 ozs. troy per ton.

The above return shows an increase of 3825 oits. on the produce for December, owing to an increased quantity of mineral stamped, and a better yield of half an oitava in the month of January.

COST AND PROFIT.

The produce being	52,750·8 oits.	
Deduct loss melting into bars	220·3 ,,	
	52,530·5 at 7s. 9d. per oit.—	£20,355 11 5
Cost		7,306 5 11
Profit		£13,049 5 6

REDUCTION DEPARTMENT.—The whole machinery of this department was kept steadily at work reducing mineral and treating sand during the past month, excepting when under essential repairs, and though the mills were not kept at full rate of speed throughout, yet a large amount of duty was performed by them, as likewise by the arrastras.

AMALGAMATION MACHINERY.—The total mineral reduced by the mills amounts to 6027 tons, and the quantity of sand collected from the strakes and subjected to the amalgamation process to 6224 cubic feet, the former being fully 300 tons more than and the latter precisely the same as that treated in the previous month.

The loss of mercury for the month is rather high, being 240 lbs., 36 lbs. of which was, however, lost in the process of distillation, owing to the retort failing during the process.

The loss of gold is more favourable, being at the rate of 1·157 oits. per ton.

GOLD EXTRACTED TO DATE.—The produce extracted during the first division of February, a period of nine days, amounts to 14,358·6 oits. It has been derived as follows:—

	Oits.	Tons.	Oits. per ton.
From mineral stamped	13,021·0 from	1437 =	9·061
Killas	250·3 ,,	144 =	1·738
Re-treatment	1,087·3 ,,	— =	·687
Total	14,358·6 ,,	1581 =	9·080

Equal to ..... 1655·3128 ozs. ..... 1·047 oz. per ton.

Throughout the greater part of this division some of the sets of stamps, especially the Addison and Powle's, were driven at a slow rate of speed, owing to a diminished supply of water being available, and the duty performed has consequently been again unusually low.

Since the 10th inst. very favourable rains have been falling, and as there is every appearance at present of these continuing, we may hope that a supply of water is assured for some time.

The health of the establishment continues good

The gold troop was dispatched from Morro Velho, on Feb. 14, with 21 boxes, containing 64 gold bars, weighing inall 101,512·8 oits. = 11,702·7700 oz. troy.

N.B.—The gold has duly arrived.

The following telegrams have been received:—

Feb. 21: Produce 9 days (first division of February), 14,250 oits.; yield, 9·0 oits. per ton.

Feb. 23: Profit for the month (January), 13,000*l*.

March 2: Produce 10 days (second division of February), 18,750 oits.; yield, 9·8 oits. per ton.

March 11: Produce for the month (February), 52,500 oits.: yield, 9·4 oitavas per ton.

March 22: Produce 10 days (first division of March), 17,750 oits.—6878*l*.; yield, 9·3 oits. per ton. Profit for the month of February, 13,200*l*.

RICHMOND CONSOLIDATED.—Cablegram from the mine at Eureka, Nevada: Hall, London: Week's run, $36,000.

— R. Rickard, Feb. 29: During the past week we have not done anything in the 800 drift, but have been timbering the shaft to that level and getting the framework for the 800 in place; it will take about four days more before it is all completed, when we shall resume the sinking of the shaft and drifting in the 800 ft. level. Very good progress is being made in the 700 drift from the shaft, also the same level from the winze; if the ground continues as it is now we shall have made the connection in a week. No. 1 stope in back of the 600 is looking very well; the ore has extended more to the south east than seen elsewhere, and thereby increases considerably the quantity of ore available between the 500 and 600 levels. No. 2 stope is about the same as when last reported on, still rising in ore, which is still narrow.—Smelting: The furnaces have been in full blast all the week, and have smelted more than the average quantity of ore. Our stock of charcoal has considerably decreased during the past week; the delivery is very limited, owing to the bad state of the roads. The engine is not working satisfactorily, and needs repair; in fact, all the machinery requires a thorough overhauling; it has been in constant work for nearly a year—not stopped for any repairs since last April.

CHICAGO (Silver).—W. S. Godbe, March 4: The Flavilla output for February was 771 tons—good average ore. The mine looks remarkably well, and has materially improved at bottom of No. 1 switch incline—nearly 900 ft. down. The streak of rich ore also, over 5 tons of which averaged 175 ozs. silver to the ton, is continuing, and may lead to considerable quantity.

EXCHEQUER (Gold and Silver).—Lewis Chalmers, Feb. 28: During the bygone week I have kept the sleigh on the road, and hauled 255 sacks of ore=25 tons. To-day we had had another fall of snow, but I dispatched the team this morning in hopes they may get through it and keep the road open. At 100 ft. above the 140 (winze) in raising we have struck very rich ore and a fine lode. The 4 inch column was put in the shaft and connections made, and the steam pipe will be in and the pump lowered to the 300 to-morrow. The sump at the 300 was finished yesterday, so that we are now—or, rather, will be to morrow—again in order, and ready to commence taking out ore in good shape. The cage guides are also all in to the 300. At the mill things are progressing, and on Monday next I hope to commence running the eight stamp mill and three reverberatories, from which I hope to produce 6 tons per day. Meantime I have four carpenters, who, after running commences, will frame the new battery and the timber for the additional 26 ft. of building. I have had the old reverberatories repaired, a new double chimney built to the dry kiln, my assay and melting furnace chimney, the top of which was blown off by the storm, repaired, and everything in good order for a successful run, which I hope, barring accidents, to commence on Monday. The shareholders of this company must now be satisfied that I have not been far wrong in pressing on them the necessity or sinking. The 300 ft. level is something worth seeing, the whole face back a few feet nothing but such ore as I sent you small samples of—or, as the Cornishmen call it, "bloody ore," from its ruby tinge. True, our 140 (winze) stope is again looking, as my foreman says, splendid, but then that is too near the furnace to give you any backs, and also too near the surface to be homogeneous or uniform for any extent. Too much prospecting cannot be done on this lode, as you never know when you are to make a rich strike.

SOUTH AURORA—OLMETA COPPER COMPANY OF CORSICA. AND THE LAMA COMPANY OF CORSICA.—J. G. Cunningham, March 18: Olmeta Company: This mine remains the same, except at the end of the main gallery; the flat lode appears to be dipping more into the mountain, and a fine large vein of yellow ore is now in the head, the whole lode carrying mineral, and being about 3 ft. thick. We have large quantities of mineral at five or six ends, and when the result of your assays are known we can take out a large quantity of mineral. If the poor sort will not bear shipment expenses the better qualities will, and the rest can be treated here with good profit.—Lama Company: No. 2 winze is yielding at the present moment about ½ ton of ore to the fathom, and the new copper lode continues to yield a fair quantity of green, with boulders of magnificent yellow ore. Altogether matters look very cheering in this mine.

GOLD RUN.—J. A. Stone, Feb. 27: My last letter was on the 15th inst., and on the 16th the Miners' Ditch Company's blocks were worn so badly that several went out, which caused them to stop washing, and clean up. I had to clean up at the same time, having washed 11½ days of 24 hours. On the 17th I retorted both cleans-up, and obtained 169 ozs. ($3100), as will appear from my Mint memorandum, which I shall enclose with my accounts in my next letter. I expected my second clean up would have yielded a little more than it did, but, taking into consideration that I have been opening the mine through a very deep shaft, and have worked cautiously to guard against filling up, I think I have done very well. The more it is opened the better it will pay. I am moving the "giant" a few feet further down into the cut to-day. The Miners' Ditch Company were shut off seven days, having been delayed in getting their new blocks in the flume, in consequence of which I did not commence washing again until the 23rd inst. I took advantage of the time, however, to do some blasting in the bed rock incline to protect my bell-wire from being cut by the falling gravel. The new "giant" works nicely, and I am now using a 5-in. nozzle, and can run much more water through the ground sluice, and can wash more gravel than with the old "giant." I am yet unable to determine the distance to western rim of bed-rock, as the boulders are about the same as when I last wrote.

SANTA BARBARA (Gold).—Mr. Hilcke, Feb. 14: During January 985 tons of mineral were stamped, yielding 3·377 oits. per ton, or a total of 3327 oits. of gold, which, valued at 8s. 6d. per oit., amounts to 1413*l*. 19s. 6d., as the estimated value of the produce for the month. The mine working cost for the same period was, at exchange, 27¾d., 986*l*. 1s. 4d., thus leaving an estimated profit of 427*l*. 18s. 2d. for January. The capital expenditure during the month amounted to 52*l*. 1s. 9d., for Senzala and new corn-mill.—Mine: The sinking of the shaft had progressed satisfactorily during the month, it having been sunk 1 fm. 3 ft.; the lode at the bottom is looking well, and was about 8 ft. wide, its underlie being on a considerable flatter angle than at a higher horizon in the mine. The lode in the adit and No. 3 stopes was without change, and produced good quality ore. In No. 2 stopes the lode had somewhat improved again, and contained less hornblende. No improvement is perceptible in the lode of No. 1 stopes and level, it being still contracted and disordered by killas. Taking the lode as a whole throughout the mine, there was an improvement both in appearance and yield compared to previous month. Quantity of stone raised during the month 1417 tons, of which 420 tons were rejected as refuse stone, and 12 tons were unstamped, leaving in stock at the end of the month 51 tons of picked ore unstamped. The decrease in the tonnage of ore stamped was caused by the water supply not having been sufficient to stamp all the stone, in consequence of the small rainfall and unprecedented heat experienced during January. Average quantity of stone raised per borer for the month 31·9 tons.

CAPE COPPER.—Capt. Tonkin, Jan. 31: Ookiep: The 80, north east from No. 16 winze, continues in unproductive ground; the layers are still running very flat, and until they take a dip we shall probably we without ore in the level. The stope that we are carrying forward only a few feet above the back of the driving is yielding very rich copper, and I believe a short rise in the back of the bottom level would reveal the bunch of ore. The 68, east from No. 13 winze, continues in very good ore ground; this driving has now reached a distance of 60 fms. from the flookan course, so that we have a wonderful length of ore ground at this point, but how wide the productive ground will prove in the eastern part of the mine it is impossible for me to tell, as the nearest stope is about 13 fms. behind the end of the driving, but I have no reason to think it will prove very narrow. The stopes in the 68 are, on the whole, looking well, and we continue to open out a good width of moderately productive ground. In the 58 we are extending the stope south from No. 14 winze in a very satisfactory manner, and the other stopes in the same level are producing the estimated quantities of copper ore, and without doubt they will continue to yield well for a considerable time. In the 48 and upper levels we are not stoping vigorously, therefore I have no particular remarks to make respecting any of those places. All the dressing operations are at present being carried on regularly, but the returns for the month are necessarily reduced in consequence of the stoppage through the changing of the crushing-engine.

Capt. Tonkin, Capt. Ninnis, Jan. 25: Spectakel: The stopes throughout the mine are just now looking much the same as when last reported. We continue to push forward the trial stopes in the hope that the small branches of ore we are following will by-and-bye become of some value. We are very short of water for dressing purposes, therefore we cannot assist the returns from the mine by treating surface reserves.

Capt. Tonkin, Capt. Lanksbury, Jan. 15: Trial Mines: The 20, east from shaft at Korolusberg, produces a little copper, but nothing of any value. The 10, which is the most eastern point in the mine, continues to yield some good ore, and the end of the driving looks promising. At Nababeep we have commenced to sink the shaft, and we are taking out some good lumps of purple ore from the bottom. The 17, north from the bottom of shaft, has not changed since last reported. The driving at Kilduncan Mine is producing a little copper ore, mixed with a large quantity of iron pyrites. The 20, driving from bottom of shaft at Narrap, is without change to notice.

Returns for January: Yield from Ookiep, 775 tons of 30 per cent.; from Spectakel, 47 tons of 27 per cent.—Bills of Lading Received: 330 tons of ore per Martha Stevens, 500 tons per Ocean King, and 190 tons per Roman (s.).—Arrivals at Port Nolloth: The Antonio Vinent and the Corsair, to load about 1000 tons.—Sales by Public Ticketing: On Feb. 2, 780 tons at an average of 16s. 1½d. per unit, realising approximately 19,700*l*.; on March 7, 677 tons at an average of 15s. 7d. per unit, realising approximately 17,850*l*.—Dividend Declared: 20s. per share, payable on March 2.

PESTARENA UNITED.—T. Roberts, March 20: District of Pestarena, at Surface: Part of the shed over the new picking-floors has been put up, and a few boys and girls set to work picking and preparing ore for the mills. On the 13th we started the first six mills amalgamating, and, provided the water in the Anza increase as may be expected, we calculate running these mills regularly. Not much progress has been made in the past week towards the six additional mills owing to the masons and carpenters being on jobs connected with the first six mills, fixing the stone-breaker gear, roofing picking floors, and commencing the erection of an incline from Acquavite adit road to the crusher. Underground the water is again in fork in the bottom of the new incline shaft, and sinking resumed. During this week we shall take down the lode which is standing in the shaft 2 metres high. The 33 end, north on No. 1 lode, is poor at present. The 33, north on No. 2 lode, yields 2 tons of ore for amalgamation per fathom. The lode in the 55 end north also yields 2 tons of ore per fathom. In Acquavite the lode in the 23 end north is yielding 4 tons per fathom, but the 55 end south is poor at present.—District of Val Toppa: No change in the cross-cut westward of Zero level. The lode in the end of the intermediate level, driving in the mountain under Zero, continues to yield 12 tons per fathom, worth 1 oz. of gold per ton.—Great Quartz Lode: The drive in north end of ground above No. 2 level yields 12 tons per fathom, at 7 dwts. of gold per ton.—New Lode: The rise in the back of No. 2, south of 1st cross-cut, has been communicated to No. 1 level, opening up some good average ground for stoping. The drive in the side of stopes, on a flat lode south of winze under No. 2 level, yields 8 tons per fathom, at 15 dwts. per ton. The drive in the north end of ground on this lode yields 6 tons, at about 8 dwts. per ton. The end in No. 2 level, driving south of the fourth cross-cut on a flat lode east of new lode, is yielding 6 tons per fathom, worth 10 dwts. per ton. No change in the No. 3 level, south on the great quartz lode. In the stopes we have a slight falling off in the quantity, but the quality of ore from them continues good, and we have made, so far as gone in this month, a fair quantity of amalgam.

BENSBERG.—C. Craze, March 20: Victoria Shaft: The ground in cross-cut, north of this shaft, is much of the same character as before reported, containing spots of lead with pyrites. I am pleased to say we have now better weather, and the rate of our engine is not so much by over a stroke per minute as for some weeks past. We hope now our speed in driving will be good. There is no change in the 14, west of shaft, except that the lead ore produced is a little freer from the mixture of other minerals; lode worth 1¼ ton per fathom. The lode in the 14, east of shaft, produces 1 ton of ore per fathom, but from its appearance to-day I think we shall have an improvement here soon. Nothing else calling for remark at present.

THE ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

MINA GRANDE.

Jan. 27, 1876: Underground the chief feature in the way of a change to note is that we have cut into ore in the Mina Grande 12 fm. level, and of which I have advised Messrs. Kelly to notify you by way of Mazatlan by telegraph. On Saturday last, after viewing the unpromising nature of the ground in the end of the eastern cross-cut, and being so far to the east (as the sketch will explain), although still in lode, we determined to try another week's driving in the cross-cut west before facing the dead ground we have to the north, and in two days cut through a strong well formed wall into ore, at a distance of 27 ft. from the east wall of the bunch in the Tunnel level. We are now in 4 ft., in tolerably solid ore of the same nature, as far as the eye can judge, as we had in the upper level. Should this prove to be the ore bunch some disturbance may be looked for between the Tunnel level and the 12 to account for the ore body being thrown so much to the west, the more especially as the wall we cut through before finding the ore has an eastern underlie. We are forcing the cross-cut as hard as possible, and the ore is fair for driving in.

Feb. 3: In the west cross-cut in the 12 we are into the ore 8 ft. 6 in., and as we drive it gets more solid and leady, with some very good stones of yellow copper ore. The zinc appears to continue as above. Next week we shall commence opening out the level and knocking down the ore from this part of the mine. In the vein at the north end of the tunnel we are still rising, and are now 30 ft. over Tunnel level. The ground improves as we rise, although very gradually, and the spar also improves in appearance, and is opening out wider. I have still hopes that we may by persevering find something to reward the explorations here. The work is necessarily slow in this place, as we have no nearer ventilation than the Balvanera shaft, and the air is very poor and the rise unnaturally hot. Altogether appearances underground are more cheering than for some time, and as soon as I can arrange to draw on the company, that is when I can ascertain the most favourable terms, I will start anew the various explorations that have been in abeyance for some time—Tirito shaft, Tunnel end, and 32 north, and cross-cut in same east ought to be added, and also the sinking of Balvanera shaft.

Feb. 10: Although the works were stopped we have, of course, kept our English miners employed, and put them to drive the cross cut, which is still in ore, but not so solid as it was in the upper works. We have also started driving on the east wall of the bunch, towards the north. Although we have no sign in the cross-cut of any wall yet on the west side of the ore bunch that would determine its width, I do not think we are justified in expecting anything like an equal width of ore to what we have on the Tunnel level. We have now upwards of 12 feet, and the general dip of the ore in the bunch is to the east instead of to the west, as if the whole body of the ore had been violently thrust to the west, and it gives good indications of again following its proper westerly underlie under the 12, thus favouring the assumption that the dislocation does not extend much below that level. Of course it is too early yet to speak with any certainty.

PROVIDENCIA AND TIRITO.

Jan. 20: During the week we have been working only on the new east lode, the 10 back, and the Purisima as regards taking out ore. All the above places are in the Providencia Mine, and in neither is there any change to report. If anything, perhaps, the ore is improving, except in the Purisima, and from whence we now draw our only supply of green ore. In the 32, in the Providencia Mine, we commenced to sink on the green ore, but find we cannot get down more than 6 ft. on account of the water. We are now stoping down to that level the length of the ore without finding any change. On the whole, it is very poor.

Jan. 27: Providencia Mine is still turning out fair ore from the east lode, and the back of the 10, which is now some 10 ft. above Tunnel level, and which gives some indications of changing to, if not a green, at least a more docile ore as we rise.

Feb. 3: Included in the ore account are 6 tons of a new class of ore, got partly from the new east lode and partly from the stope in the lode over the 10 fm. level back, where, in fact, the two lodes unite; it is a very clean copper ore, without either lead or zinc. The assay for silver gives $166, and for copper 12½ per cent.—say, gross value about $195 per ton. As soon as possible I intend sending it off for shipment by steamer. During the present month I hope to raise 20 tons of this ore. We could by roasting beneficiate the ore on the patio with a loss of (say) 25 per cent., and the value of the copper would be lost also. Altogether the loss may be estimated at $70 per ton, and I have, therefore, thought it better to ship it, as the loss will more than cover expenses. In the Tirito Mine the ore is changing in back of the stope over the Tunnel level. Originally we had only black ore, and now we find it overlaid with the ore above mentioned, which appears to be from its constituents an ore midway between the black and green. My idea is that as we rise it will, if it continues, gradually change to green ore.—Providencia: The northern part of the lode over the back of the 10, and which crossed the boundary of the Tirito Mine, forms a splice, as you will notice by the sketch sent last week, with the new east lode. In the back we have broken through into old workings, but they have not extended to the new east lode. In this latter we have cross-cut 12 ft. east, and now have what may be taken as the east wall; it is almost a pure limestone, very hard and solid, and of a glassy nature by reason of the quartz it contains in very fine particles; the lode is not by any means solid, and contains at a moderate estimate 50 per cent. of waste, but the ore is of good quality. This month, through the proportion of ore treated from this lode, we are for the first time for some months enabled to estimate for copper in the export ore. The wet assay giving for B. ore 10¾ per cent., B. 8½ per cent., and for S. 8½ per cent.; this is a pleasing feature, and I hope may continue. It may be that in the east lode we are in a poor floor of ground, and that it may improve as we sink or rise. In the Purisima we have still some fair green ore in the north end, and in the cross-cut from the Providencia old works we have this week met with very good green ore, but as usual in this mine only in balls.

THE CHANNEL TUNNEL.—The Channel Tunnel Railway was the subject of a discussion on Monday night at a meeting of the Society of Engineers, held in the society's hall, Westminster Chambers. The discussion arose upon a paper read by Mr. Nursey at the last meeting. Mr. Vaughan Pendred, the President, who presided, opened the debate by dwelling upon the great importance of the subject, considering the immense amount of capital that would have to be invested in the undertaking, but he at the same time thought it desirable fully to consider whether there was any absolute necessity for a railway connection between Great Britain and the Continent. There were, he said, many difficulties in the way of a successful accomplishment of the work, and even if the tunnel we constructed, the ventilation was a most important problem to be solved, because when engines were running through it it would be necessary to renew the whole of the air once an hour, and to do this they must convey a current of air through it at the rate of 20 miles an hour, and how to do this no suggestion had been thrown out.—Mr. Nursey, upon the question as to whether or not a Channel railway would prove a commercial success, drew a comparison between the imports and exports of this country during the past six years, from the increase in which he calculated that the railway would get an income of 2,500,000, which was equal to 10 per cent. on a capital of 28,000,000*l*. He further argued that it was to be assumed that it would pay, or the London, Chatham, and Dover and South-Eastern Railways would not have gone to Parliament for powers to contribute towards the preliminary expenses of the undertaking.—Mr. Valentine Bell thought, if the statement of the Chairman as to the ventilation was correct, locomotives could not be used, but he was not disposed to accept the ventilation difficulty as an insurmountable obstacle.—Mr. Schonheyder thought that it was generally conceded as highly desirable that there should be other means of communication between England and the Continent than the present, and he thought the only practical proposition was that for the construction of the tunnel.—Mr. Houghton took exception to the plan of a double tube on the bed of the Channel, as suggested by Mr. Nursey in his paper, pointing to the many difficulties which would arise in carrying it out, and expressing an opinion that tubes could not successfully laid, and, even if it were possible, the cost would be more like 35,000,000*l*. than the estimate of 22,000,000*l*. as mentioned.—Mr. Cargill thought that the proposed communication with the Continent should be looked upon rather in a national than in a financial point of view. His view of the paying capabilities of the tunnel was that, taking into account the many difficulties that would have to surmounted, it could not by any possibility pay.—Some further discussion took place, in the course of which some diversity of opinion was expressed upon the possibility of constructing the tunnel, and especially in regard to ventilation, to effect which numerous suggestions were thrown out.

THE SUR-WEALDEN EXPLORATION.—An impression has become general, through the statements of our contemporaries, that the Sub-Wealden boring has been permanently stopped. This is not the case, for at the last meeting of the committee it was determined to carry it on to a depth of 2000 ft., and if funds continue to flow in with the success which has previously characterised this movement the boring, it is hoped, will be carried to the greatest depth attainable. The boring has now reached a depth of more than 1900 ft., and was to be re commenced this week. Should, however, a greater depth than 2000 ft. be determined on, it will be necessary to enlarge and re line the hole, which will cost from 600*l*. to 700*l*. Arrangements are being made by which it is hoped that a continuous core may be obtained from the present depth to that of 2000 ft. We believe the Government grant of 1*l*. a foot for each foot bored ceases at 2000 ft., and, looking to the important light the prosecution of the boring will throw, not only on many theoretical questions of modern science, but on so many doubtful points of practical interest to England, it is sincerely to be hoped that the advisability of continuing the grant will be seriously considered by Her Majesty's Ministers.—*Nature*.

SEAMLESS PAPER BOX MACHINE.—From the enormous number of paper boxes used in the packing of small metallic articles—pens, catches, &c.—the description given in the "London Iron Trade Exchange" of an improved machine at present being introduced by Mr. WM. GIBBS, metal-broker, of Wolverhampton, will be interesting to many readers of the *Mining Journal*. In this machine the form carrier or apparatus by which the perforated forms are carried to and from the mould in which the box or other hollow article is formed is so constructed as that the form carriers are separate from and independent of the apparatus by which they are moved, and they are moved in a horizontal plane, by which means he is enabled not only to put the perforated form on to the form carriers with greater facility, and, therefore, with greater rapidity, but he can alter or change the forms and form carriers with greater ease. The form carriers are moved on a circular guide by an arm, to which an intermittent motion is given by suitable mechanism, and when one of the form carriers is brought into its position under the mould it is raised up into the said mould; the pulp is then admitted to the mould, and a compound piston descends. This piston consists of two parts, the outer portion of which is annular (cylindrical or otherwise, as may be required), and acts as a valve to cut or shut off the supply of pulp from the mould, and descends; first the inner portion serves to compress the pulp in the mould at the time that the outer portion of this compound piston descends, a communication being open between the exhaust chamber of an exhaust pump and the interior of the form carrier (which is hollow); the moisture is drawn or sucked away from the article which is being formed in the mould, to aid which removal of the moisture air is allowed to enter through small grooves or apertures formed between the outer and inner portions of the compound piston. When this has been partially accomplished the inner portion of the compound piston descends, and the sides of the mould are caused to contract tightly about the form, compressing the pulp upon it, the compressible sides of the mould are then relaxed, and the form carrier with the box or other hollow article on the perforated form descends from the mould, and is carried on the circular guide to the place where the box or other hollow article on the perforated form is taken off the form carrier and placed on the endless belt or chain of the dryer or drying apparatus. The form carrier is so constructed as that it can be readily adapted for making both the box and the box lid, and also deep or shallow hollow articles, by simply turning round a ring on the outside of the form carrier.

QUICKSILVER PRODUCTION OF CALIFORNIA.—The quantity of quicksilver produced on the Pacific Coast in the year 1875 amounted to about 56,000 flasks. This is wholly the fruit of California mines; none of the other Pacific States or Territories have yet made any quicksilver, though cinnabar in small quantities has been found in some of them. The total production of this metal throughout the world now reaches about 100,000 flasks, of which California is at present turning out fully one half. In a few years more the yield of this State will be likely to greatly exceed that of all the world besides. The new Almaden Mine produced in 1875, 13,648 flasks, of 76½ lbs. each, or 1,054,062 lbs. in all; being an increase of 6 per cent. over the product of 1874.—*Commercial Herald*.

JOINING DRIVING BELTS OR BANDS.—According to the invention of Mr. T. PEARCE, of Aston, near Birmingham, the fastenings are made from sheet brass or other sheet metal by dies and pressure, and consist of a middle or plate having at each end and at right angles thereto two or more parallel slots or prongs. These prongs are passed from the front of the abutting ends of the band through piercings in the said ends, and the projecting parts of the prongs are clinched or doubled upon the back of the band, so that the ends of the said prongs meet, or nearly meet, at the junction of the two ends of the band. Four or other number of these fastenings are used, and a firm, strong, and flat junction of the ends thereby effected, the ends of the band being supported both at front and back by the fastenings.

EPPS'S COCOA—GRATEFUL AND COMFORTING.—"By a thorough knowledge of the natural laws which govern the operations of digestion and nutrition, and by a careful application of the fine properties of well-selected cocoa, Mr. Epps has provided our breakfast tables with a delicately flavoured beverage which may save us many heavy doctors' bills. It is by the judicious use of such articles of diet that a constitution may be gradually built up until strong enough to resist every tendency to disease. Hundreds of subtle maladies are floating around us, ready to attack wherever there is a weak point. We may escape many a fatal shaft by keeping ourselves well fortified with pure blood and a properly nourished frame."—*Civil Service Gazette*.

BLAKE'S PATENT STEAM PUMP.

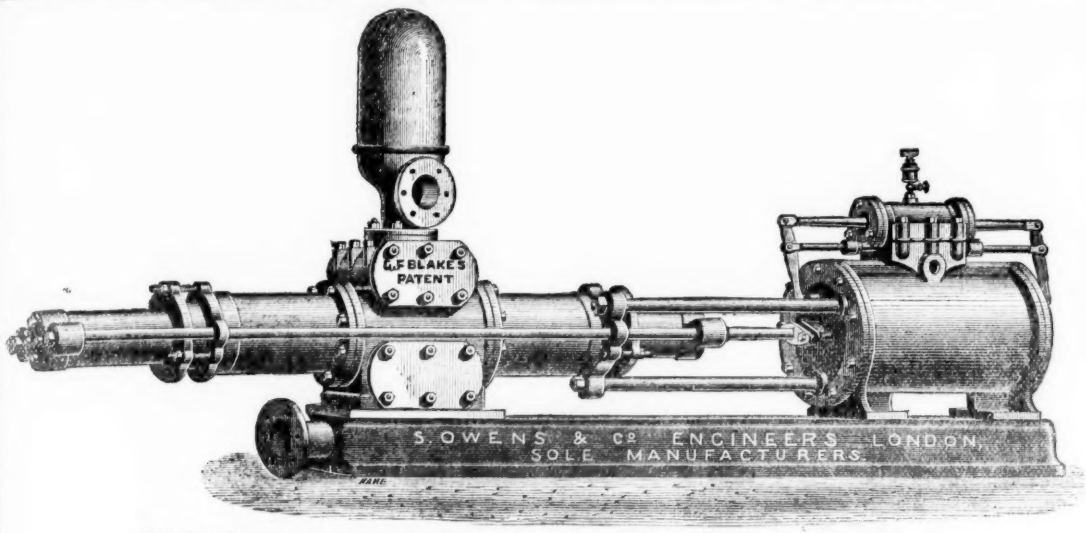
MORE THAN 8000 IN USE.

SOLE MAKERS FOR GREAT BRITAIN,

S. OWENS & CO.,

Hydraulic and General Engineers, Whitefriars-street, London;
And at 195, Buchanan-street, Glasgow (W. HUME, AGENT).

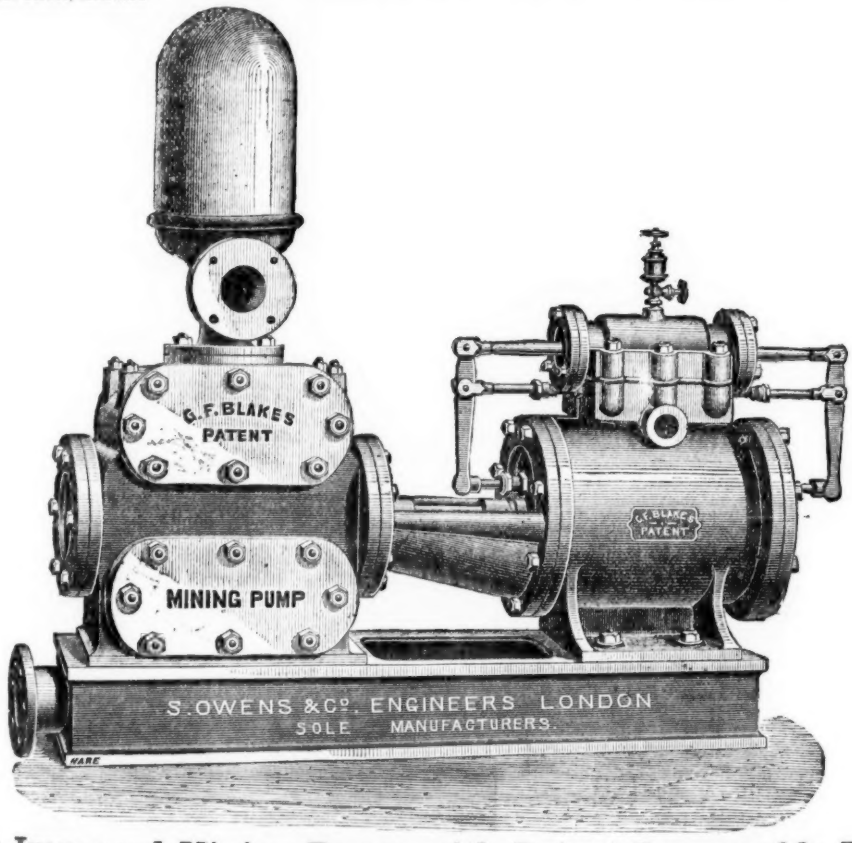
These PUMPS from their SIMPLICITY, RELIABILITY, DURABILITY, and ECONOMY are SPECIALLY SUITED FOR MINING PURPOSES, where large quantities of water require to be raised from great or medium depths with CERTAINTY. They are double-action in their construction, throwing a constant stream of water, can be made of any stroke to suit the space in which they have to work, can be arranged with any combination of steam and water cylinders to suit the pressure and lift against which it is desired to work them, are made of the very best materials and highest class of workmanship, and all working parts can be readily got at by any ordinary workman, and replaced if necessary by a duplicate part (all such being interchangeable) in the shortest possible time. For situations where gritty and sandy water has to be pumped the DOUBLE-PLUNGER PATTERN is recommended. Where space is limited the PISTON PUMP is better suited, a novel feature of which is the PATENT REMOVEABLE LINING, which can be removed in a few minutes and substituted with a new one, without disturbing any other part of the pump.



Blake's Improved Double-plunger Steam Pump.

S. OWENS AND CO.,

In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.



Blake's Improved Mining Pump, with Patent Removeable Lining to Pump Cylinder,

Any combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:—

Dia. of steam cylinders.. In.	12	12	12	12	14	14	14	16	16	16	16	18	18	18	18	20	20	20	20	24	24
Dia. of water cylinders.. In.	3	4	5	6	4	5	6	4	5	6	8	4	5	6	8	5	7	8	9	6	8
Length of stroke ..... In.	18	18	18	24	24	24	24	24	24	24	24	24	30	30	30	30	30	36	36	36	42
No. of strokes per minute..	30	30	30	30	25	25	25	22	22	22	22	22	22	22	22	20	20	17	17	17	15
Quantity in gallons per hour, approximately ...	1440	2610	4200	5940	2940	4620	6600	2646	4158	5940	10620	2646	5160	7500	13200	4586	9000	12360	15660	6720	120

PRICES FOR THE ABOVE, OR ANY SPECIAL SIZE, AND ILLUSTRATED CATALOGUES FURNISHED ON APPLICATION.

PATENT CONDENSORS

Can be supplied for any size pump to effect a saving of fully 30 per cent. in the consumption of fuel, greatly increasing their efficiency

The Blake Pump will work under water, and as efficiently with compressed air as with steam.

BLAKE'S DONKEY PUMPS FOR FEEDING BOILERS KEPT IN STOCK.

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BEST KNOWN MATERIAL.

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FOR LOCOMOTIVE AND MARINE BOILERS,

EITHER

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THE BIRMINGHAM WAGON COMPANY (LIMITED) MANUFACTURE RAILWAY WAGONS of EVERY DESCRIPTION, for HIRE and SALE, by immediate or deferred payments. They have also wagons for hire capable of carrying 6, 8, and 10 tons, part of which are constructed specially for shipping purposes. Wagons in working order maintained by contract.

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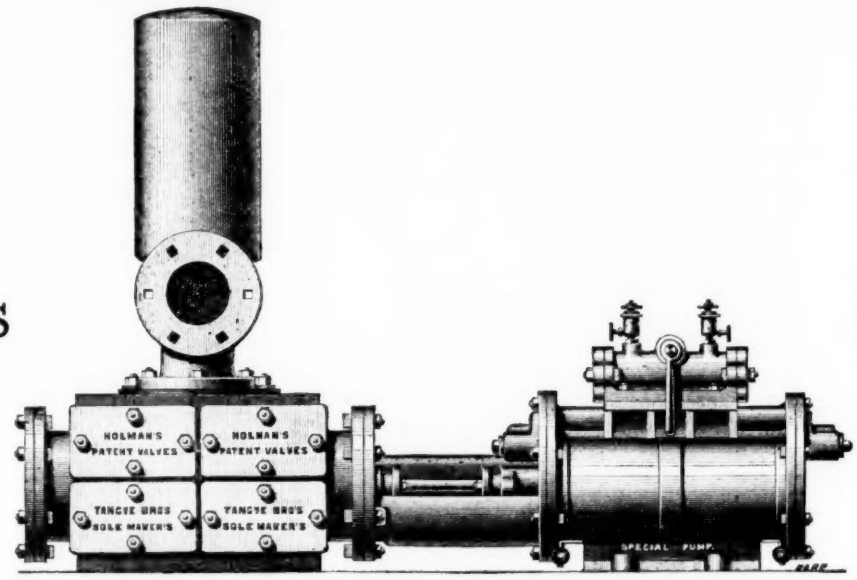

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Diameter of Steam Cylinder ...In.	3	4	4	4	5	5	5	6	6	6	6	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	
Diameter of Water Cylinder ...In.	1½	2	3	4	3	4	5	3	4	5	6	3	4	5	6	7	4	5	6	7	8	5	6	7	8	9	5	
Length of Stroke .....In.	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	18	24	12	
Gallons per hour	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070	7330	9750	13,000	5070	7330	9750	13,000	16,519	3670	
Price ....£	16	18	20	25	22 10	27 10	32 10	25	30	35	40	30	35	40	45	50	40	45	50	55	65	50	55	60	70	85	55	

CONTINUED.

Diameter of Steam Cylinder..In.	10	10	10	10	12	12	12	12	12	12	14	14	14	14	14	14	16	16	16	16	16	18	18	18				
Diameter of Water Cylinder..In.	7	8	9	10	6	7	8	9	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	12				
Length of Stroke .....In.	12	18	24	24	18	18	18	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24				
Gallons per hour	9750	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000				
Price .....£	55	75	90	100	75	80	85	110	120	140	110	120	130	140	160	180	140	150	160	180	200	190	200	220				

Intending purchasers of Steam Pumps would do well to observe the great length of stroke, short steam cylinder, and short piston of the "Special" Steam Pump, as compared with the short stroke, long steam cylinder, and long piston of the Pumps of other makers, as the efficiency and durability of the machine, and the space occupied by same, greatly depend upon this. The advantage of long strokes will be obvious when purchasers are reminded that each set of suction and delivery valves of a "Special" Steam Pump with 24 in. stroke, running at 120 ft. per minute, would open and close only 30 times per minute, as against 120 times per minute in a Pump with only 6 in. stroke performing same duty.

The Special" Steam Pump can be worked by Compressed Air as well as by Steam.

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TURNS WASTE STEAM INTO GREAT POWER.

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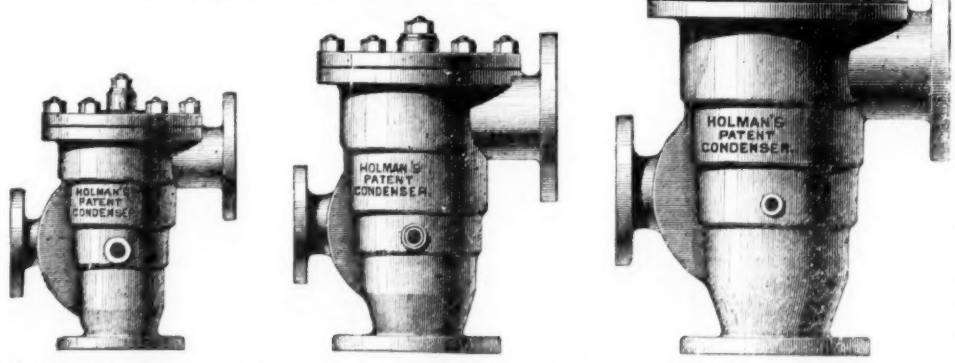

These Condensers are made to suit any n nd kind of Steam Pump. They form a p the suction pipe of the Pump, and w they effectually condense the exhaust st they produce an average vacuum of 10 lbs square inch on the steam piston, increas the duty of the Engine, and effecting a s in fuel of from 20 to 50 per cent.

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GENTLEMEN,—I have great pleasure in recording my entire satisfaction with the working of the Holman's Patent Steam Pump Condenser which you have supplied to us. The complete condensation of the steam is, apart from its value in the strict economic sense, a most valuable feature in the drainage of underground workings. The perfect manner in which this important result is accomplished by your Condenser is extremely creditable to you, and merits the thanks and commendation of the Mining Engineer. When we start the "Special" Steam Pump the Condenser commences working automatically, and maintains a constant vacuum of 10¾ lbs. per square inch, even when we run the Pump upwards of 80 strokes (106 feet) per minute. It may perhaps be interesting to you to know that when we were running the Pump at 84 strokes (168 feet) per minute, the steam gauge indicating a steam pressure of 36 lbs. per square inch, 80 yards from the Pump and the Condenser vacuum gauge on the exhaust pipe indicating a steady vacuum of 21½ inches, I turned the exhaust steam from the Condenser into the atmosphere, when the speed at once fell to 44 strokes per minute. The economy thus shown is really so great that the cost of the Condenser must be saved in a very short time. (Signed) J. THOMPSON.

Price from 30s. to 40s. per inch diameter of Steam Cylinder, according to the relative Diameter of Pump for which Conden er is required.

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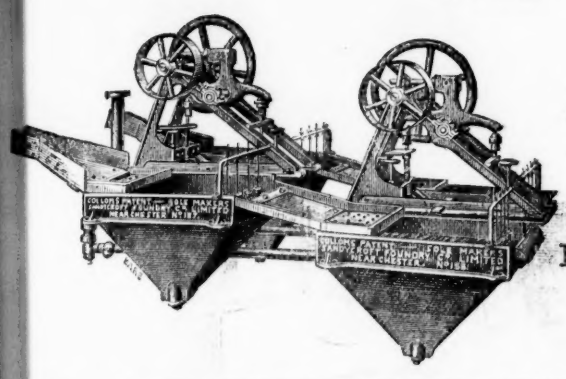

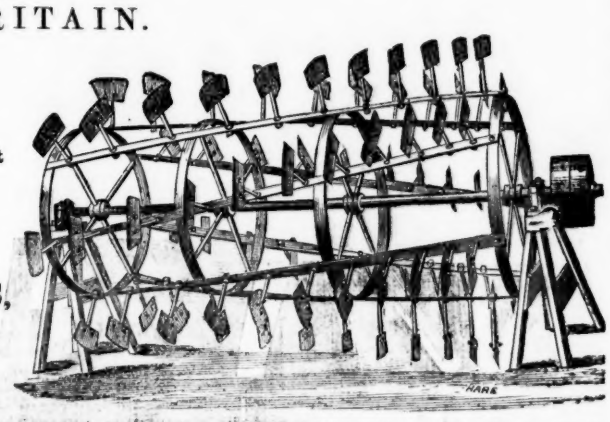

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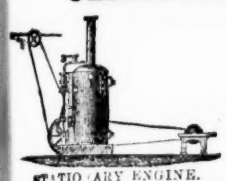
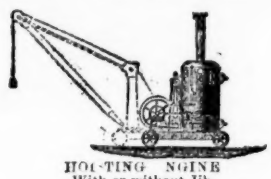
LONDON OFFICE: 6, QUEEN STREET PLACE, E.C.

CHAPLIN'S PATENT PORTABLE STEAM ENGINES & BOILERS.



STATIONARY ENGINE. No building required.



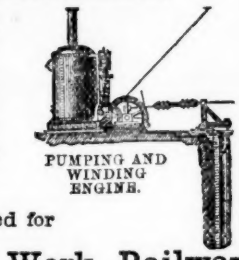
HOISTING ENGINE With or without Jib.

STEAM CRANE. For Wharf or Rail.

CONTRACTORS' LOCOMOTIVE.

TRACTION AND ROADWAY ENGINE.

SHIPS ENGINE AND DISTILLER.



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The ORIGINAL combined Vertical Engines and Boilers, introduced by Mr. CHAPLIN in 1855, specially designed and adapted for

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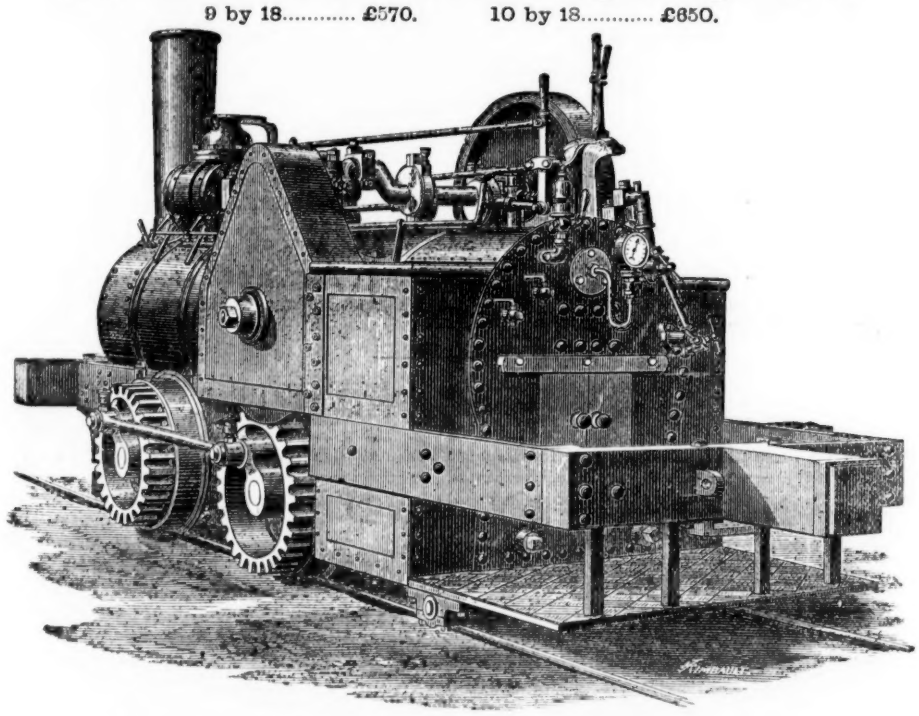

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The above represents LEWIN'S STEEL-GEARED LOCOMOTIVE, from a photo of one working on a 22 in gauge, for replacing horses.

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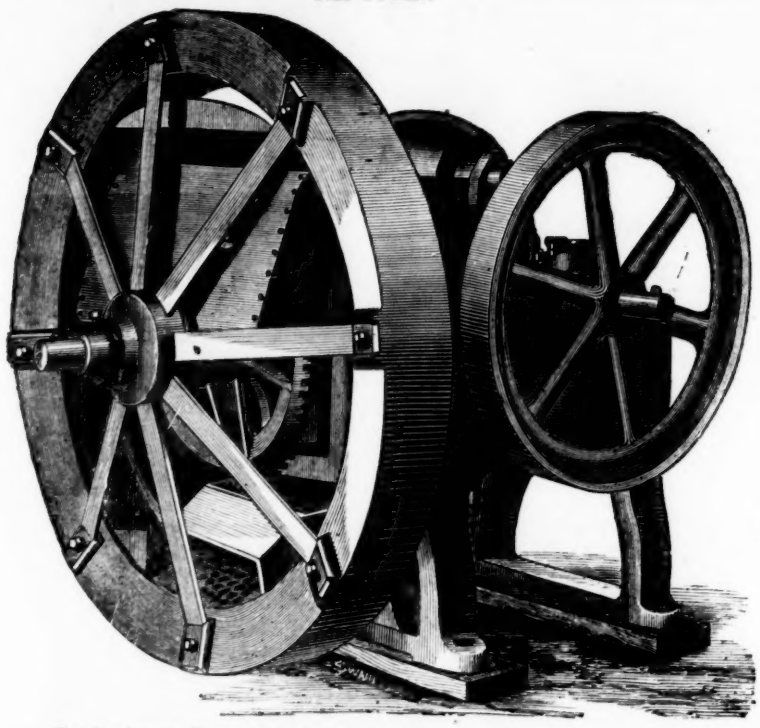

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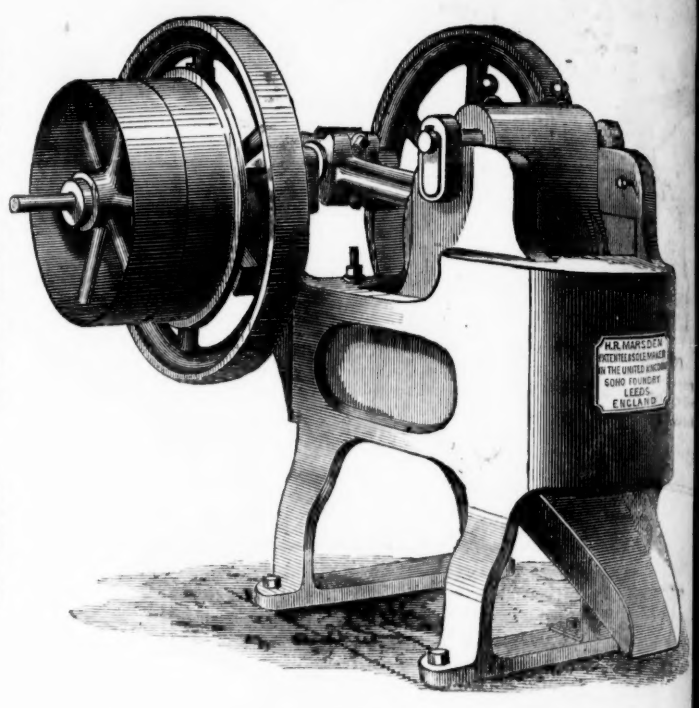

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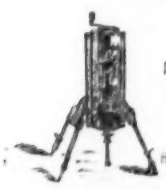

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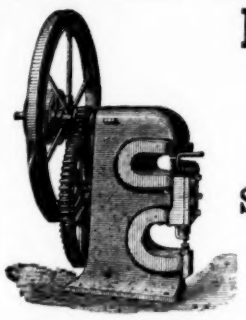

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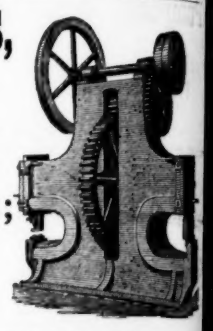

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